



香港天文台

HONG KONG OBSERVATORY

一九九九
熱帶氣旋

**TROPICAL CYCLONES IN
1999**

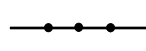
香港天文台 HONG KONG OBSERVATORY

一九九九年的熱帶氣旋路徑圖
TRACKS OF TROPICAL CYCLONES IN 1999

每日協調世界時零時位置(香港時間上午八時)
Daily Positions at 00 UTC(08 HKT)



每六小時位置
Intermediate 6-hourly Positions



颱風
Typhoon



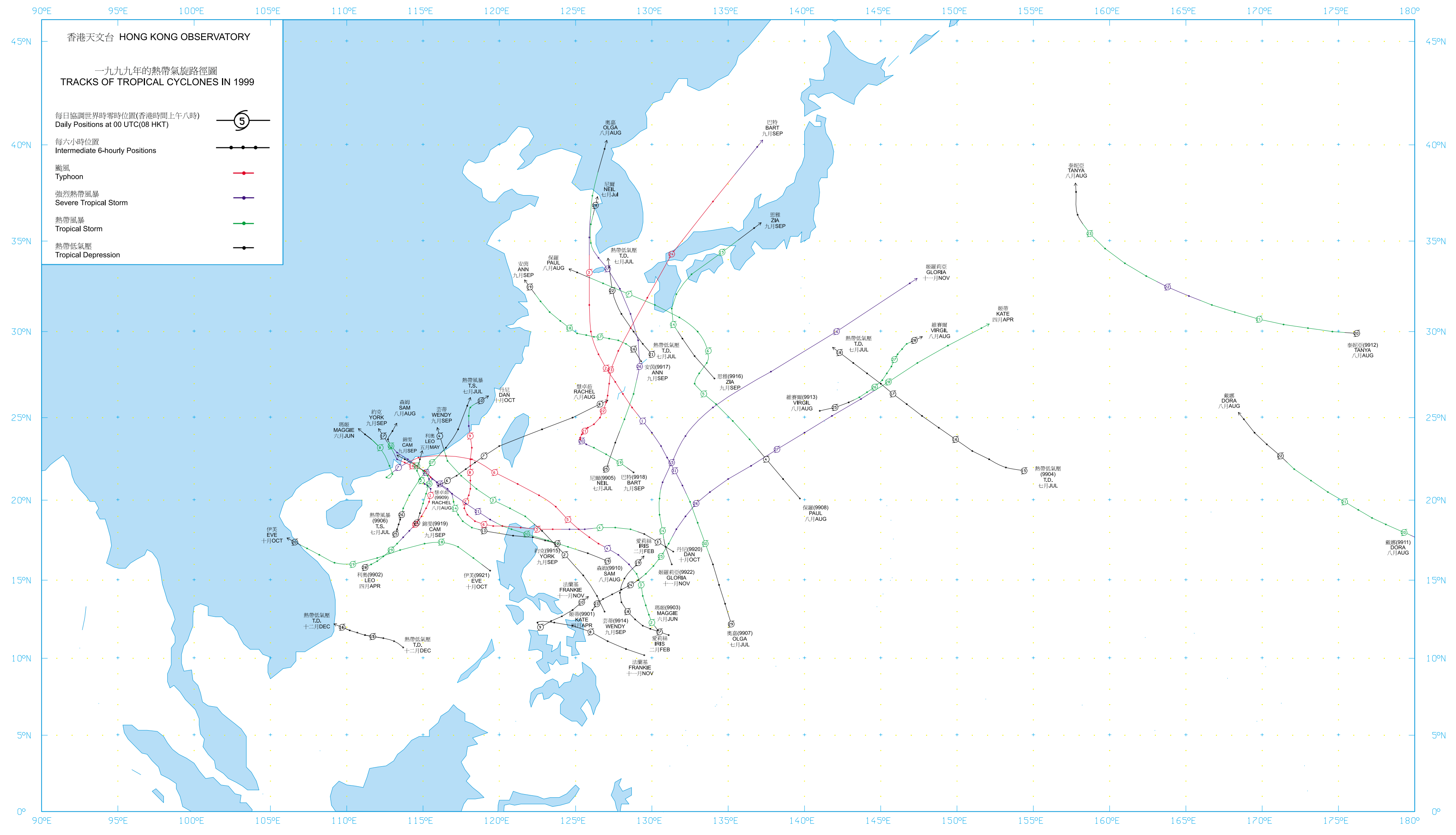
強烈熱帶風暴
Severe Tropical Storm



熱帶風暴
Tropical Storm



熱帶低氣壓
Tropical Depression



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目錄

	頁
1. 引言	13
2. 一九九九年熱帶氣旋概述	23
3. 一九九九年影響香港的熱帶氣旋	35
3.1 颱風利奧(9902):四月二十八日至五月二日	36
3.2 颱風瑪姬(9903):六月二日至八日	41
3.3 熱帶風暴(9906):七月二十五日至二十八日	50
3.4 颱風森姆(9910):八月十九日至二十三日	55
3.5 熱帶風暴芸蒂(9914):九月一日至四日	67
3.6 颱風約克(9915):九月十二日至十七日	72
3.7 強烈熱帶風暴錦雯(9919):九月二十四日至二十六日	84
3.8 颱風丹尼(9920):十月三日至十日	91
4. 熱帶氣旋統計表	97
5. 一九九九年熱帶氣旋的位置及強度數據	117

◆

CONTENTS

	Page
1. INTRODUCTION	13
2. TROPICAL CYCLONE OVERVIEW FOR 1999	23
3. TROPICAL CYCLONES AFFECTING HONG KONG IN 1999	35
3.1 Typhoon Leo (9902) : 28 April - 2 May	36
3.2 Typhoon Maggie (9903) : 2 - 8 June	41
3.3 Tropical Storm (9906) : 25 - 28 July	50
3.4 Typhoon Sam (9910) : 19 - 23 August	55
3.5 Tropical Storm Wendy (9914) : 1 - 4 September	67
3.6 Typhoon York (9915) : 12 - 17 September	72
3.7 Severe Tropical Storm Cam (9919) : 24 - 26 September	84
3.8 Typhoon Dan (9920) : 3 - 10 October	91
4. TROPICAL CYCLONE STATISTICS AND TABLES	97
5. TROPICAL CYCLONE POSITION AND INTENSITY DATA, 1999	117

圖

	頁
1.1 本年報內提及的測風站及潮汐測量站之分佈地點	22
2.1 一九九九年北太平洋西部及南海區域的熱帶氣旋出現次數之每月分佈	32
2.2 一九六一至一九九零年間在北太平洋西部及南海區域的熱帶氣旋平均出現次數之每月分佈	32
2.3 一九九九年八個影響香港的熱帶氣旋的路徑圖	33
2.4 一九九九年四個橫過香港的熱帶氣旋的路徑圖	33
3.1.1 一九九九年四月二十八日至五月二日颱風利奧(9902)的路徑圖	39
3.1.2 一九九九年四月二十九日至五月二日的雨量分佈圖	39
3.1.3.a 一九九九年四月三十日約上午11時利奧的可見光衛星圖片	40
3.1.3.b 一九九九年五月二日約上午11時利奧的可見光衛星圖片	40
3.2.1.a 一九九九年六月二日至八日颱風瑪姬(9903)的路徑圖	45
3.2.1.b 一九九九年六月七日瑪姬橫過香港時的路徑圖	45
3.2.2 一九九九年六月七日京士柏自動氣象站錄得的風向、風速及氣壓	46
3.2.3 一九九九年六月七日上午4時香港各站錄得的風向和風速	46
3.2.4 一九九九年六月五日至八日的雨量分佈圖	47
3.2.5.a 一九九九年六月六日約下午2時瑪姬的可見光衛星圖片	47
3.2.5.b 一九九九年六月七日約上午4時瑪姬的紅外線衛星圖片	48
3.2.6 一九九九年六月七日上午4時的立體雷達回波圖片	48
3.2.7 荃灣一幢工廈的棚架被吹塌	49
3.2.8 一艘運油躉船在屯門碼頭附近沉沒，漏出的柴油染污海面	49
3.3.1 一九九九年七月二十五日至二十八日熱帶風暴(9906)的路徑圖	53
3.3.2 一九九九年七月二十五日至二十七日的雨量分佈圖	53
3.3.3.a 一九九九年七月二十七日約上午2時熱帶風暴的紅外線衛星圖片	54
3.3.3.b 一九九九年七月二十七日約上午11時熱帶風暴的可見光衛星圖片	54
3.4.1.a 一九九九年八月十九日至二十三日颱風森姆(9910)的路徑圖	60
3.4.1.b 一九九九年八月二十二日森姆橫過香港時的路徑圖	60
3.4.2 一九九九年八月二十二日打鼓嶺自動氣象站錄得的風向、風速及氣壓	61
3.4.3 一九九九年八月二十二日下午6時15分香港各站錄得的風向和風速	61
3.4.4 一九九九年八月二十日至二十六日的雨量分佈圖	62
3.4.5.a 一九九九年八月二十二日約下午2時森姆的可見光衛星圖片	62
3.4.5.b 一九九九年八月二十三日約下午2時森姆的可見光衛星圖片	63
3.4.6 一九九九年八月二十二日下午2時的立體雷達回波圖片	63

圖

	頁
3.4.7 香港國際機場發生的意外	64
3.4.8 天平新村的水浸	64
3.4.9 小欖一處路面的水浸	65
3.4.10 深井新村發生的山泥傾瀉	65
3.4.11 香港仔田灣街多處受山泥沖毀	66
3.5.1 一九九九年九月一日至四日熱帶風暴芸蒂(9914)的路徑圖	70
3.5.2 一九九九年九月三日至五日的雨量分佈圖	70
3.5.3.a 一九九九年九月三日約下午2時芸蒂的可見光衛星圖片	71
3.5.3.b 一九九九年九月四日約上午2時芸蒂的紅外線衛星圖片	71
3.6.1.a 一九九九年九月十二日至十七日颱風約克(9915)的路徑圖	77
3.6.1.b 一九九九年九月十六日約克橫過香港時的路徑圖	77
3.6.2 一九九九年九月十六日長洲自動氣象站錄得的風向、風速及氣壓	78
3.6.3 一九九九年九月十六日正午12時香港各站錄得的風向和風速	78
3.6.4 一九九九年九月十三日至十八日的雨量分佈圖	79
3.6.5.a 一九九九年九月十五日約下午2時約克的可見光衛星圖片	79
3.6.5.b 一九九九年九月十六日約上午11時約克的可見光衛星圖片	80
3.6.6 一九九九年九月十六日上午10時30分的立體雷達回波圖片	80
3.6.7 灣仔數幢大廈的玻璃幕牆給颶風吹落	81
3.6.8 在灣仔，一天秤被吹塌後擊中附近一幢大廈	81
3.6.9 一貨櫃辦公室被捲落海，在皇后碼頭附近漂浮	82
3.6.10 西貢多艘遊艇被吹至擱淺	82
3.6.11 在葵涌貨櫃碼頭，一批貨櫃被吹倒	83
3.6.12 荃灣圓玄學院一大樹被吹至連根拔起	83
3.7.1.a 一九九九年九月二十四日至二十六日強烈熱帶風暴錦雯(9919)的路徑圖	88
3.7.1.b 一九九九年九月二十六日錦雯橫過香港時的路徑圖	88
3.7.2 一九九九年九月二十四日至二十六日的雨量分佈圖	89
3.7.3.a 一九九九年九月二十五日約下午2時錦雯的可見光衛星圖片	89
3.7.3.b 一九九九年九月二十六日約上午11時錦雯的可見光衛星圖片	90
3.7.4 一九九九年九月二十六日上午11時的立體雷達回波圖片	90
3.8.1 一九九九年十月三日至十日颱風丹尼(9920)的路徑圖	94
3.8.2.a 一九九九年十月七日約下午2時丹尼的可見光衛星圖片	94
3.8.2.b 一九九九年十月九日約上午8時丹尼的紅外線衛星圖片	95

FIGURES

		Page
1.1	Locations of anemometers and tide gauge stations mentioned in this report	22
2.1	Monthly frequencies of first occurrence of tropical cyclones in the western North Pacific and the South China Sea in 1999	32
2.2	Monthly mean frequencies of first occurrence of tropical cyclones in the western North Pacific and the South China Sea, 1961-1990	32
2.3	Tracks of the eight tropical cyclones affecting Hong Kong in 1999	33
2.4	Tracks of the four tropical cyclones over Hong Kong in 1999	33
3.1.1	Track of Typhoon Leo (9902) : 28 April - 2 May 1999	39
3.1.2	Rainfall distribution on 29 April - 2 May 1999	39
3.1.3.a	Visible imagery of Leo at around 11 a.m. on 30 April 1999	40
3.1.3.b	Visible imagery of Leo at around 11 a.m. on 2 May 1999	40
3.2.1.a	Track of Typhoon Maggie (9903) : 2 - 8 June 1999	45
3.2.1.b	Track of Maggie over Hong Kong on 7 June 1999	45
3.2.2	Traces of wind direction, wind speed and pressure recorded at King's Park automatic weather station on 7 June 1999	46
3.2.3	Winds recorded at various stations in Hong Kong at 4 a.m. on 7 June 1999	46
3.2.4	Rainfall distribution on 5 - 8 June 1999	47
3.2.5.a	Visible imagery of Maggie at around 2 p.m. on 6 June 1999	47
3.2.5.b	Infra-red imagery of Maggie at around 4 a.m. on 7 June 1999	48
3.2.6	3-D Radar echoes captured at 4 a.m. on 7 June 1999	48
3.2.7	Scaffolding collapsed at an industrial building in Tsuen Wan	49
3.2.8	An oil barge carrying light diesel sank near Tuen Mun pier, its cargo polluting the sea	49
3.3.1	Track of the Tropical Storm (9906) : 25 - 28 July 1999	53
3.3.2	Rainfall distribution on 25 - 27 July 1999	53
3.3.3.a	Infra-red imagery of the Tropical Storm at around 2 a.m. on 27 July 1999	54
3.3.3.b	Visible imagery of the Tropical Storm at around 11 a.m. on 27 July 1999	54
3.4.1.a	Track of Typhoon Sam (9910) : 19 - 23 August 1999	60
3.4.1.b	Track of Sam over Hong Kong on 22 August 1999	60
3.4.2	Traces of wind direction, wind speed and pressure recorded at Ta Kwu Ling automatic weather station on 22 August 1999	61
3.4.3	Winds recorded at various stations in Hong Kong at 6.15 p.m. on 22 August 1999	61
3.4.4	Rainfall distribution on 20 - 26 August 1999	62
3.4.5.a	Visible imagery of Sam at around 2 p.m. on 22 August 1999	62
3.4.5.b	Visible imagery of Sam at around 2 p.m. on 23 August 1999	63
3.4.6	3-D Radar echoes captured at 2 p.m. on 22 August 1999	63

FIGURES

	Page
3.4.7 An air accident occurred at the Hong Kong International Airport	64
3.4.8 Flooding in Tin Ping San Tsuen	64
3.4.9 Flooding at a section of road in Siu Lam	65
3.4.10 A landslide in Sham Tseng San Tsuen	65
3.4.11 Several sections of Tin Wan Street in Aberdeen damaged by mudflow	66
3.5.1 Track of Tropical Storm Wendy (9914) : 1 - 4 September 1999	70
3.5.2 Rainfall distribution on 3 - 5 September 1999	70
3.5.3.a Visible imagery of Wendy at around 2 p.m. on 3 September 1999	71
3.5.3.b Infra-red imagery of Wendy at around 2 a.m. on 4 September 1999	71
3.6.1.a Track of Typhoon York (9915) : 12 - 17 September 1999	77
3.6.1.b Track of York over Hong Kong on 16 September 1999	77
3.6.2 Traces of wind direction, wind speed and pressure recorded at Cheung Chau automatic weather station on 16 September 1999	78
3.6.3 Winds recorded at various stations in Hong Kong at noon on 16 September 1999	78
3.6.4 Rainfall distribution on 13 - 18 September 1999	79
3.6.5.a Visible imagery of York at around 2 p.m. on 15 September 1999	79
3.6.5.b Visible imagery of York at around 11 a.m. on 16 September 1999	80
3.6.6 3-D Radar echoes captured at 10.30 a.m. on 16 September 1999	80
3.6.7 Hurricane winds shattered the curtain walls of several buildings in Wan Chai	81
3.6.8 A crane blown down and struck a nearby flat in Wan Chai	81
3.6.9 A mobile office in a transport container blown into the water, floating near Queen's Pier	82
3.6.10 Yachts blown ashore in Sai Kung	82
3.6.11 Containers blown down at Container Terminal in Kwai Chung	83
3.6.12 A tree uprooted at Yuen Yuen Hok Yuen in Tsuen Wan	83
3.7.1.a Track of Severe Tropical Storm Cam (9919) : 24 - 26 September 1999	88
3.7.1.b Track of Cam over Hong Kong on 26 September 1999	88
3.7.2 Rainfall distribution on 24 - 26 September 1999	89
3.7.3.a Visible imagery of Cam at around 2 p.m. on 25 September 1999	89
3.7.3.b Visible imagery of Cam at around 11 a.m. on 26 September 1999	90
3.7.4 3-D Radar echoes captured at 11 a.m. on 26 September 1999	90
3.8.1 Track of Typhoon Dan (9920) : 3 - 10 October 1999	94
3.8.2.a Visible imagery of Dan at around 2 p.m. on 7 October 1999	94
3.8.2.b Infra-red imagery of Dan at around 8 a.m. on 9 October 1999	95

表

	頁
1.1 一九九六至一九九九年間所採用的非正式熱帶氣旋名單	18
1.2 二零零零年一月一日生效的新熱帶氣旋名單	19
1.3 本年報內提及各風速表的位置及海拔高度	21
2.1 香港各熱帶氣旋警告信號之意義	34
3.1.1 利奧(9902)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	37
3.1.2 利奧(9902)影響香港期間所錄得的日雨量	38
3.1.3 利奧(9902)影響香港期間所錄得的最高潮位及最大風暴潮	38
3.2.1 瑪姬(9903)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	43
3.2.2 瑪姬(9903)影響香港期間所錄得的日雨量	44
3.2.3 瑪姬(9903)影響香港期間所錄得的最高潮位及最大風暴潮	44
3.3.1 熱帶風暴(9906)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	51
3.3.2 熱帶風暴(9906)影響香港期間所錄得的日雨量	52
3.3.3 熱帶風暴(9906)影響香港期間所錄得的最高潮位及最大風暴潮	52
3.4.1 森姆(9910)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	58
3.4.2 森姆(9910)影響香港期間所錄得的日雨量	59
3.4.3 森姆(9910)影響香港期間所錄得的最高潮位及最大風暴潮	59
3.5.1 芸蒂(9914)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	68
3.5.2 芸蒂(9914)影響香港期間所錄得的日雨量	69
3.5.3 芸蒂(9914)影響香港期間所錄得的最高潮位及最大風暴潮	69
3.6.1 約克(9915)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	75
3.6.2 約克(9915)影響香港期間所錄得的日雨量	76
3.6.3 約克(9915)影響香港期間所錄得的最高潮位及最大風暴潮	76
3.7.1 錦雯(9919)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	86
3.7.2 錦雯(9919)影響香港期間所錄得的日雨量	87
3.7.3 錦雯(9919)影響香港期間所錄得的最高潮位及最大風暴潮	87

表

	頁
3.8.1 丹尼(9920)影響香港期間所錄得的最高陣風、最高每小時平均風速及風向	93
3.8.2 丹尼(9920)影響香港期間所錄得的最高潮位及最大風暴潮	93
4.1 一九九九年北太平洋西部及南海區域的熱帶氣旋一覽	100
4.2 一九九九年內為船舶發出的熱帶氣旋警告	101
4.3 一九九九年天文台所懸掛的熱帶氣旋警告信號及警報發出的次數	102
4.4 一九五六至一九九九年間每年各熱帶氣旋警告信號的懸掛次數及總時段	103
4.5 一九五六至一九九九年間每年位於香港責任範圍內以及每年引致天文台需要懸掛熱帶氣旋警告信號的熱帶氣旋總數	104
4.6 一九五六至一九九九年間天文台懸掛熱帶氣旋警告信號的時段	105
4.7 一九九九年當熱帶氣旋影響香港時本港的氣象觀測摘要	106
4.8.1 一九九九年位於香港600公里範圍內的熱帶氣旋及其為本港帶來的雨量	108
4.8.2 一八八四至一九三九年及一九四七至一九九九年間十個為香港帶來最多雨量的熱帶氣旋	109
4.9 一九四六至一九九九年間引致天文台需要懸掛十號颶風信號的颱風	110
4.10 一九九九年熱帶氣旋在香港所造成的損失	111
4.11 一九六零至一九九九年間熱帶氣旋在香港所造成的人命傷亡及破壞	113

TABLES

		Page
1.1	Unofficial tropical cyclone name list in use 1996 - 1999	18
1.2	New tropical cyclone name list effective from 1 January 2000	19
1.3	Positions and elevations of various anemometers mentioned in this report	21
2.1	Meaning of all tropical cyclone warning signals in Hong Kong	34
3.1.1	Maximum gust peak speeds and maximum hourly mean winds for Leo (9902)	37
3.1.2	Daily rainfall amounts for Leo (9902)	38
3.1.3	Times and heights of the maximum sea level and the maximum storm surge for Leo (9902)	38
3.2.1	Maximum gust peak speeds and maximum hourly mean winds for Maggie (9903)	43
3.2.2	Daily rainfall amounts for Maggie (9903)	44
3.2.3	Times and heights of the maximum sea level and the maximum storm surge for Maggie (9903)	44
3.3.1	Maximum gust peak speeds and maximum hourly mean winds for the Tropical Storm (9906)	51
3.3.2	Daily rainfall amounts for the Tropical Storm (9906)	52
3.3.3	Times and heights of the maximum sea level and the maximum storm surge for the Tropical Storm (9906)	52
3.4.1	Maximum gust peak speeds and maximum hourly mean winds for Sam (9910)	58
3.4.2	Daily rainfall amounts for Sam (9910)	59
3.4.3	Times and heights of the maximum sea level and the maximum storm surge for Sam (9910)	59
3.5.1	Maximum gust peak speeds and maximum hourly mean winds for Wendy (9914)	68
3.5.2	Daily rainfall amounts for Wendy (9914)	69
3.5.3	Times and heights of the maximum sea level and the maximum storm surge for Wendy (9914)	69
3.6.1	Maximum gust peak speeds and maximum hourly mean winds for York (9915)	75
3.6.2	Daily rainfall amounts for York (9915)	76
3.6.3	Times and heights of the maximum sea level and the maximum storm surge for York (9915)	76
3.7.1	Maximum gust peak speeds and maximum hourly mean winds for Cam (9919)	86
3.7.2	Daily rainfall amounts for Cam (9919)	87
3.7.3	Times and heights of the maximum sea level and the maximum storm surge for Cam (9919)	87
3.8.1	Maximum gust peak speeds and maximum hourly mean winds for Dan (9920)	93
3.8.2	Times and heights of the maximum sea level and the maximum storm surge for Dan (9920)	93
4.1	List of tropical cyclones in the western North Pacific and the South China Sea in 1999	100
4.2	Tropical cyclone warnings for shipping issued in 1999	101

TABLES

		Page
4.3	Tropical cyclone warning signals hoisted in Hong Kong and number of warning bulletins issued in 1999	102
4.4	Frequency and total duration of display of tropical cyclone warning signals : 1956 - 1999	103
4.5	Annual number of tropical cyclones in Hong Kong's area of responsibility and the number that necessitated the display of tropical cyclone warning signals in Hong Kong : 1956 - 1999	104
4.6	Duration of tropical cyclone warning signals hoisted in Hong Kong : 1956 - 1999	105
4.7	A summary of meteorological observations recorded in Hong Kong during the passages of tropical cyclones in 1999	106
4.8.1	Rainfall associated with each tropical cyclone that came within 600 km of Hong Kong in 1999	108
4.8.2	Ten wettest tropical cyclones in Hong Kong (1884 - 1939, 1947 - 1999)	109
4.9	Typhoons requiring the hoisting of the Hurricane Signal No. 10 during the period 1946 - 1999	110
4.10	Damage caused by tropical cyclones in Hong Kong in 1999	111
4.11	Casualties and damage caused by tropical cyclones in Hong Kong : 1960 - 1999	113

第一節

引言

Section 1

INTRODUCTION

除了在一九四零至一九四六年有過短暫中斷外，天文台自一八八四年以來便一直進行地面氣象觀測，並將整理好的數據撮列於由天文台出版的《氣象資料》年刊內。天文台在一九四七年開始進行高空氣象觀測後，該年刊便分成兩冊：分別是《氣象資料第一冊（地面觀測）》及《氣象資料第二冊（高空觀測）》。一九八一年，年刊第二冊改稱為《無線電探空儀觀測摘要》，而第一冊亦於一九八七年改稱為《香港地面觀測年報》。一九九三年，該兩刊物由一本名為《香港氣象觀測摘要》的新刊物所取代。這份摘要載列了地面及高空的氣象數據。

一八八四至一九三九年期間，部分對香港造成破壞的颱風的報告，曾以附錄形式載於《氣象資料》年刊內。而在一九四七至一九六七年出版的《天文台年報》，更擴充了有關熱帶氣旋的內容，收納所有導致香港吹烈風的熱帶氣旋的報告。其後，年刊系列加推《氣象資料第三冊（熱帶氣旋摘要）》，以記載每年北太平洋西部及南海區域所有熱帶氣旋的資料。此冊第一期在一九七一年出版，內容包括一九六八年赤道至北緯 45 度、東經 100 至 160 度範圍內所有熱帶氣旋的報告。由於有氣象偵察機提供報告（此項服務已在一九八七年八月停辦）及氣象衛星圖片，在原本資料短缺的海洋上追蹤熱帶氣旋位置的工作比從前順利得多。因此，第三冊的覆蓋範圍東面邊界於一九八五年開始，由東經 160 度伸展至 180 度。一九八七年，第三冊改稱為《熱帶氣旋年報》，但內容則大致上維持不變。由一九九七年起，此年報加增中文版本以雙語刊出。

在一九三九年及以前，每年北太平洋西部及南海區域的熱帶氣旋的路徑圖都收錄於《氣象資料》年刊內。由一九四七至一九六七年，則載列於《氣象資料第一冊》內。在一九六一年以前，熱帶氣旋的路徑只顯示每日位置。在較早期的刊物內，熱帶氣旋的每日定位時間在某程度上還未統一。但到了一九四四年以後，則一直維持以每日協調世界時（UTC）零時作定位。此項改變的資料詳載於天文台出版的《技術記錄第十一號第一冊》內。由一九六一年開始，所有熱帶氣旋的路徑圖都顯示每六小時的位置。

為了能儘早滿足傳媒、航運界及其他有關人士或團體的需求，天文台自一九六零年開始就影響香港的個別熱帶氣旋編寫報告初稿。這些報告可提供給有需要的人士使用。初時，天文台只就那些曾導致天文台懸掛暴風或烈風信號的熱帶氣旋編寫報告初稿，但到了一九六八年，則須就每個引致天文台懸掛熱帶氣旋警告信號的熱帶氣旋編寫報告初稿。

本年報根據熱帶氣旋中心附近的最高持續地面風速，把熱帶氣旋分為以下四個級別：

- (i) 熱帶低氣壓（T.D.）的最高持續風速為每小時 63 公里以下。
- (ii) 熱帶風暴（T.S.）的最高持續風速為每小時 63 至 87 公里。
- (iii) 強烈熱帶風暴（S.T.S.）的最高持續風速為每小時 88 至 117 公里。
- (iv) 颱風（T.）的最高持續風速為每小時 118 公里或以上。

除特別列明外，在本年報內提及的最高持續風速均為 10 分鐘內風速的平均值；每小時平均風速為該小時前 60 分鐘內的平均風速；每日雨量為該日香港時間午夜前 24 小時內的總雨量。

從一九四七年開始，北太平洋西部及南海區域的熱帶氣旋非正式地採用美國聯合颱風警告中心所編訂的名單上的名字。表 1.1 是一九九六至一九九九年所採用的名單。但由二零零零年開始，日本氣象廳會根據一套新名單為每個達到熱帶風暴強度的熱帶氣旋命名。表 1.2 是二零零零年一月一日起生效的新熱帶氣旋名單。這些名字除了用於為國際航空及

航海界發放的預測和警報外，亦是向國際傳媒介發放熱帶氣旋消息時採用的規範名稱。另外，日本氣象廳在一九八一年起已獲委託為每個在北太平洋西部及南海區域出現而達到熱帶風暴強度的熱帶氣旋編配一個四位數字編號。例如編號“9901”代表在一九九九年區內第一個被日本氣象廳分類為熱帶風暴或更強的熱帶氣旋。在本年報內，此編號會顯示在緊隨著熱帶氣旋名稱的括弧內，例如強烈熱帶風暴姬蒂(9901)。

本年報內的地面風資料，是由天文台所操作的測風站網絡而錄得的。表 1.3 是該網絡內各站的位置及海拔高度。

熱帶氣旋產生的最大風暴潮是由裝置在香港多處的潮汐測量器量度的。圖 1.1 是本年報內提及的各個風速表及潮汐測量站的分佈地點。

本年報第二節是一九九九年所有影響北太平洋西部及南海區域的熱帶氣旋的概述。

而本年報第三節是一九九九年影響香港的熱帶氣旋的個別詳細報告，內容包括：

- (a) 該熱帶氣旋對香港造成的影響；
- (b) 懸掛熱帶氣旋警告信號的過程；
- (c) 香港各地錄得的最高陣風風速及最高每小時平均風速；
- (d) 香港天文台錄得的最低海平面氣壓；
- (e) 香港天文台及其他地方錄得的每日總雨量；
- (f) 香港各潮汐測量站錄得的最高潮位及最大風暴潮；及
- (g) 氣象衛星雲圖及雷達回波圖（如適用）。

有關熱帶氣旋的各種資料及統計表載於本年報第四節內。

一九九九年每個熱帶氣旋的每六小時位置，連同當時的最低中心氣壓及最高持續風速，則表列於本年報的第五節內。

本年報依照內文需要採用了不同的時間系統。正式的時間以協調世界時（即 UTC）為準。至於在熱帶氣旋的敘述中，用作表示每天各時段的詞彙，例如“上午”、“下午”、“早上”、“黃昏”等則是指香港時間。香港時間為協調世界時加八小時。

Apart from a short break during 1940-1946, surface observations of meteorological elements since 1884 have been summarized and published in the Observatory's annual publication "Meteorological Results". Upper-air observations began in 1947 and from then onwards the annual publication was divided into two parts, namely "Meteorological Results Part I - Surface Observations" and "Meteorological Results Part II - Upper-air Observations". These two publications were re-titled "Summary of Radiosonde-Radiowind Ascents" and "Surface Observations in Hong Kong" in 1981 and 1987 respectively. In 1993, both of these publications were made obsolete, and since then surface and upper-air data have been included in one revised publication entitled "Summary of Meteorological Observations in Hong Kong".

During the period 1884-1939, reports on some destructive typhoons were printed as Appendices to the "Meteorological Results". This practice was extended and accounts of all tropical cyclones which caused gales in Hong Kong were included in the publication "Director's Annual Departmental Reports" from 1947 to 1967 inclusive. The series "Meteorological Results Part III - Tropical Cyclone Summaries" was subsequently introduced. It contained information on tropical cyclones over the western North Pacific and the South China Sea. The first issue, which contained reports on tropical cyclones occurring in 1968, was published in 1971. Tropical cyclones within the area bounded by the Equator, 45°N, 100°E and 160°E were described. With reconnaissance aircraft reports (terminated from August 1987 onwards) and satellite pictures facilitating the tracking of tropical cyclones over the otherwise data-sparse ocean, the eastern boundary of the area of coverage was extended from 160°E to 180° from 1985 onwards. In 1987, the series was re-titled as "Tropical Cyclones in 19YY" but its contents remained largely the same. "Tropical Cyclones in 1997" is the first bilingual (Chinese and English) edition of the series.

Tracks of tropical cyclones in the western North Pacific and the South China Sea were published in "Meteorological Results" up to 1939 and in "Meteorological Results Part I" from 1947 to 1967. Before 1961, only daily positions were plotted on the tracks. The time of the daily positions varied to some extent in the older publications but remained fixed at 0000 UTC after 1944. Details of the variation are given in the Observatory's publication "Technical Memoir No. 11, Volume 1". From 1961 onwards, six-hourly positions are shown on the tracks of all tropical cyclones.

Provisional reports on individual tropical cyclones affecting Hong Kong have been prepared since 1960 to meet the immediate needs of the press, shipping companies and others. These reports are printed and supplied on request. Initially, reports were only written on those tropical cyclones for which gale or storm signals had been hoisted in Hong Kong. By 1968, it had become necessary to produce a report on every tropical cyclone that necessitated the hoisting of tropical cyclone warning signals.

In this publication, tropical cyclones are classified into the following four categories according to the maximum sustained surface winds near their centres :

- (i) A TROPICAL DEPRESSION (T.D.) has maximum sustained winds of less than 63 km/h.
- (ii) A TROPICAL STORM (T.S.) has maximum sustained winds in the range 63-87 km/h.
- (iii) A SEVERE TROPICAL STORM (S.T.S.) has maximum sustained winds in the range 88-117 km/h.
- (iv) A TYPHOON (T.) has maximum sustained winds of 118 km/h or more.

Throughout this publication, maximum sustained surface winds when used without qualification refer to wind speeds averaged over a period of 10 minutes. Mean hourly winds are winds averaged over a 60-minute interval ending on the hour. Daily rainfall amounts are computed over a 24-hour period ending at midnight Hong Kong Time.

Over the western North Pacific and the South China Sea, since 1947 tropical cyclone names are assigned by the Joint Typhoon Warning Center in Guam according to a pre-determined but unofficial list. Table 1.1 shows list of names in use from 1996 to 1999. However, with effect from 2000, the Japan Meteorological Agency will assign names from a new list to every tropical cyclone attaining tropical storm strength. Table 1.2 shows the new name list effective from 1 January 2000. Apart from being used in forecasts and warnings issued to the international aviation and shipping communities, the names will also be used officially in information on tropical cyclones issued to the international press. Besides,

Japan Meteorological Agency has been delegated since 1981 with the responsibility of assigning to each tropical cyclone in the western North Pacific and the South China Sea of tropical storm strength a numerical code of four digits. For example, the first tropical cyclone of tropical storm strength or above as classified by Japan Meteorological Agency which occurred within the region in 1999 was assigned the code “9901”. In this publication, the appropriate code immediately follows the name of the tropical cyclone in bracket, e.g. Severe Tropical Storm Kate (9901).

Surface wind data presented in this report were obtained from a network of anemometers operated by the Hong Kong Observatory. Details of the stations are listed on Table 1.3.

Maximum storm surges caused by tropical cyclones were measured by tide gauges installed at several locations around Hong Kong. The locations of anemometers and tide gauges mentioned in this report are shown in Figure 1.1.

In Section 2, an overview of all the tropical cyclones over the western North Pacific and the South China Sea in 1999 is presented.

The reports in Section 3 are individual accounts of the life history of tropical cyclones affecting Hong Kong in 1999. They include the following information :-

- (a) the effects of the tropical cyclone on Hong Kong;
- (b) the sequence of display of tropical cyclone warning signals;
- (c) the maximum gust peak speeds and maximum hourly mean winds recorded in Hong Kong;
- (d) the lowest sea level pressure recorded at the Hong Kong Observatory;
- (e) the daily amounts of rainfall recorded at the Hong Kong Observatory and selected locations;
- (f) the times and heights of the maximum sea level and maximum storm surge recorded at various tide stations in Hong Kong;
- (g) satellite imageries and radar echoes (if applicable).

Statistics and information relating to tropical cyclones are presented in various tables in Section 4.

Six-hourly positions together with the corresponding estimated minimum central pressures and maximum sustained surface winds for individual tropical cyclones are tabulated in Section 5.

In this publication, different times are used in different contexts. The official reference times are given in Co-ordinated Universal Time and labelled UTC. Times of the day expressed as “a.m.”, “p.m.”, “morning”, “evening” etc. in the tropical cyclone narratives are in Hong Kong Time which is eight hours ahead of UTC.

表 1.1 一九九六至一九九九年間所採用的非正式熱帶氣旋名單

TABLE 1.1 UNOFFICIAL TROPICAL CYCLONE NAME LIST IN USE 1996 - 1999

<u>Column 1</u>	<u>第一欄</u>	<u>Column 2</u>	<u>第二欄</u>	<u>Column 3</u>	<u>第三欄</u>	<u>Column 4</u>	<u>第四欄</u>
ANN	安茵	ABEL	雅貝爾	AMBER	艾碧	ALEX	雅歷士
BART	巴特	BETH	貝芙	BING	秉格	BABS	寶絲
CAM	錦雯	CARLO	卡路	CASS	卡絲	CHIP	卓拔
DAN	丹尼	DALE	汀露	DAVID	大衛	DAWN	丹安
EVE	伊芙	ERNIE	安里	ELLA	艾娜	ELVIS	艾非斯
FRANKIE	法蘭基	FERN	芳雅	FRITZ	斐歷士	FAITH	菲芙
GLORIA	姬羅莉亞	GREG	格雷	GINGER	珍芝	GIL	格爾
HERB	赫拔	HANNAH	漢娜	HANK	漢奇	HILDA	希麗達
IAN	伊恩	ISA	伊莎	IVAN	艾雲	IRIS	愛莉絲
JOY	載儀	JIMMY	占美	JOAN	鍾茵	JACOB	雅各
KIRK	卻克	KELLY	姬莉	KEITH	祈輔	KATE	姬蒂
LISA	麗莎	LEVI	利維	LINDA	蓮達	LEO	利奧
MARTY	馬田	MARIE	曼莉	MORT	莫特	MAGGIE	瑪姬
NIKI	麗潔	NESTOR	尼士達	NICHOLE	麗歌	NEIL	尼爾
ORSON	奧臣	OPAL	奧蓓	OTTO	奧圖	OLGA	奧嘉
PIPER	佩萍	PETER	彼德	PENNY	彭妮	PAUL	保羅
RICK	歷克	ROSIE	露絲	REX	雷士	RACHEL	慧卓茹
SALLY	莎莉	SCOTT	史葛	STELLA	斯蒂娜	SAM	森姆
TOM	湯姆	TINA	天娜	TODD	杜特	TANYA	泰妮亞
VIOLET	維奧莉	VICTOR	維克托	VICKI	慧姬	VIRGIL	維賽爾
WILLIE	威利	WINNIE	芸妮	WALDO	華爾多	WENDY	芸蒂
YATES	雅芝	YULE	尤里	YANNI	茵妮	YORK	約克
ZANE	贊寧	ZITA	思蒂	ZEB	謝柏	ZIA	思雅

備註：當用完第四欄最後一個名稱（思雅）後，便再次重複使用第一欄首個名稱（安茵）。

Note: When the last name in Column 4 (ZIA) has been used, the sequence will begin again with the first name in Column 1 (ANN).

表 1.2 二零零零年一月一日生效的新熱帶氣旋名單

TABLE 1.2 NEW TROPICAL CYCLONE NAME LIST EFFECTIVE FROM 1 JANUARY 2000

來源	Contributed by	I	II	III	IV	V
		名字 Name	名字 Name	名字 Name	名字 Name	名字 Name
柬埔寨	Cambodia	達維 Damrey	康妮 Kong-rey	娜基莉 Nakri	科羅旺 Krovanh	莎莉嘉 Sarika
中國	China	龍王 Longwang	玉兔 Yutu	風神 Fengshen	杜鵑 Dajuan	海馬 Haima
北韓	DPR Korea	鴻雁 Kirogi	桃芝 Toraji	海鷗 Kalmaegi	鳴蟬 Maemi	米雷 Meari
中國香港	HK, China	啓德 Kai-tak	萬宜 Man-yi	鳳凰 Fung-wong	彩雲 Choi-wan	馬鞍 Ma-on
日本	Japan	天秤 Tembin	天兔 Usagi	北冕 Kammuri	巨爵 Koppu	蝎虎 Tokage
老撾	Lao PDR	布拉萬 Bolaven	帕布 Pabuk	巴蓬 Phanfone	凱薩娜 Ketsana	洛坦 Nock-ten
中國澳門	Macau, China	珍珠 Chanchu	蝴蝶 Wutip	黃蜂 Vongfong	芭瑪 Parma	梅花 Muifa
馬來西亞	Malaysia	杰拉華 Jelawat	聖帕 Sepat	鹿莎 Rusa	茉莉 Melor	苗柏 Merbok
米克羅尼西亞	Micronesia	艾雲尼 Ewiniar	菲特 Fitow	森拉克 Sinlaku	尼伯特 Nepartak	南瑪都 Nanmadol
菲律賓	Philippines	碧利斯 Bilis	丹娜絲 Danas	黑格比 Hagupit	盧碧 Lupit	塔拉斯 Talas
南韓	RO Korea	格美 Kaemi	百合 Nari	薔薇 Changmi	蘇特 Sudal	奧鹿 Noru
泰國	Thailand	派比安 Prapiroon	韋帕 Vipa	米克拉 Megkhla	妮妲 Nida	玫瑰 Kularb
美國	U.S.A.	瑪莉亞 Maria	范斯高 Francisco	海高斯 Higos	奧麥斯 Omais	洛克 Roke
越南	Viet Nam	桑美 Saomai	利奇馬 Lekima	巴威 Bavi	康森 Conson	桑卡 Sonca
柬埔寨	Cambodia	寶霞 Bopha	羅莎 Krosa	美莎克 Maysak	燦都 Chanthu	納沙 Nesat
中國	China	悟空 Wukong	海燕 Haiyan	海神 Haishen	電母 Dianmu	海棠 Haitang
北韓	DPR Korea	清松 Sonamu	楊柳 Podul	鳳仙 Pongsona	蒲公英 Mindulle	尼格 Nalgae
中國香港	HK, China	珊珊 Shanshan	玲玲 Lingling	欣欣 Yanyan	婷婷 Tingting	榕樹 Banyan
日本	Japan	摩揭 Yagi	劍魚 Kajiki	鯨魚 Kujira	圓規 Kompasu	天鷹 Washi
老撾	Lao PDR	象神 Xangsane	法茜 Faxai	燦鴻 Chan-hom	南川 Namtheun	麥莎 Matsa

表 1.2 (續)
TABLE 1.2 (cont'd)

來源	Contributed by	I	II	III	IV	V
		名字 Name	名字 Name	名字 Name	名字 Name	名字 Name
中國澳門	Macau, China	貝碧嘉 Bebinca	畫眉 Vamei	蓮花 Linfa	瑪瑙 Malou	珊瑚 Sanvu
馬來西亞	Malaysia	溫比亞 Rumbia	塔巴 Tapah	浪卡 Nangka	莫蘭蒂 Meranti	瑪娃 Mawar
米克羅尼西亞	Micronesia	蘇力 Soulik	米娜 Mitag	蘇廸羅 Soudelor	雲娜 Rananim	古超 Guchol
菲律賓	Philippines	西馬侖 Cimaron	海貝思 Hagibis	伊布都 Imbudo	馬勒卡 Malakas	泰利 Talim
南韓	RO Korea	飛燕 Chebi	浣熊 Noguri	天鵝 Koni	鮎魚 Megi	彩蝶 Nabi
泰國	Thailand	榴槤 Durian	威馬遜 Ramasoon	翰文 Hanuman	暹芭 Chaba	卡努 Khanun
美國	U.S.A.	尤特 Utor	查特安 Chataan	艾濤 Etau	庫都 Kodo	韋森特 Vicente
越南	Viet Nam	潭美 Trami	夏浪 Halong	環高 Vamco	桑達 Songda	蘇拉 Saola

表 1.3 本年報內各風速表的位置及海拔高度

TABLE 1.3 POSITIONS AND ELAVATIONS OF VARIOUS ANEMOMETERS MENTIONED IN THIS REPORT

站 Station	位置 Position		風速表的 海拔高度(米)	
	北緯 Latitude N	東經 Longitude E	Elevation of anemometer above M.S.L. (m)	
中環(天星碼頭)	Central (Star Ferry Pier)	22°17'	114°10'	17
中環廣場	Central Plaza	22°17'	114°10'	378
赤鱗角機場	Chek Lap Kok Airport	22°19'	113°55'	13
長洲	Cheung Chau	22°12'	114°02'	99
長沙灣	Cheung Sha Wan	22°20'	114°09'	30
青洲	Green Island	22°17'	114°07'	105
京士柏	King's Park	22°19'	114°10'	90
流浮山	Lau Fau Shan	22°28'	113°59'	50
平洲	Ping Chau	22°33'	114°26'	39
西貢	Sai Kung	22°23'	114°16'	31
沙螺灣	Sha Lo Wan	22°18'	113°54'	71
沙田	Sha Tin	22°24'	114°12'	16
石崗	Shek Kong	22°26'	114°05'	26
九龍天星碼頭	Star Ferry Pier Kowloon	22°18'	114°10'	18
打鼓嶺	Ta Kwu Ling	22°32'	114°09'	28
大尾篤	Tai Mei Tuk	22°29'	114°14'	71
大帽山	Tai Mo Shan	22°25'	114°07'	969
塔門	Tap Mun	22°28'	114°21'	37
大老山	Tate's Cairn	22°22'	114°13'	588
鯽魚湖	Tsak Yue Wu	22°24'	114°19'	23
將軍澳	Tseung Kwan O	22°19'	114°15'	52
青衣(青柏樓)	Tsing Yi (Ching Pak House)	22°21'	114°06'	136
屯門	Tuen Mun	22°24'	113°58'	69
橫瀾島	Waglan Island	22°11'	114°18'	82
黃竹坑	Wong Chuk Hang	22°15'	114°10'	30



圖 1.1 本年報內提及的測風站及潮汐測量站之分佈地點。

Figure 1.1 Locations of anemometers and tide gauge stations mentioned in this report.

第二節

一九九九年熱帶氣旋概述

Section 2

TROPICAL CYCLONE OVERVIEW FOR 1999

一九九九年只有26*個熱帶氣旋影響北太平洋西部及南海區域(即由赤道至北緯45度、東經100至180度所包括的範圍)，這與30年(1961-1990)的年平均31個相比為少。在這26個熱帶氣旋中，有七個達到颱風強度，比30年的年平均15.6個少一半有多，並接近1998年只得六個颱風形成的最低紀錄。圖2.1是一九九九年熱帶氣旋及颱風的出現次數之每月分佈。圖2.2是30年的每月平均分佈。

受持續的「拉尼娜」現象所影響，一九九九年北太平洋西部的熱帶氣旋多傾向於在較暖水域即其以西或高緯度處形成。本年，有三個熱帶氣旋登陸日本，四個吹襲韓國及五個橫過或在菲律賓附近掠過。巴特(9918)是一九九九年最強的颱風。它的最高持續風速及最低中心氣壓分別估計約為每小時195公里及930百帕斯卡。

全年共有11個熱帶氣旋影響南海區域，其中六個在該處形成。在這些熱帶氣旋當中，有八個在華南沿岸登陸並且對香港造成威脅，另兩個熱帶氣旋吹襲越南及一個橫過台灣。

在一九九九年的26個熱帶氣旋當中，有12個影響香港責任範圍(即北緯10至30度、東經105至125度所包括的地區)，此數目略低於30年(1961-1990)的年平均16.4個。而這12個熱帶氣旋中有七個在香港責任範圍內形成。香港天文台在一九九九年共發出316個供船舶使用的熱帶氣旋警告(表4.2)。

在「拉尼娜」的影響下，一九九九年香港的颱風季節較為特別，多項新紀錄在今年創下。

本年影響香港的那八個熱帶氣旋，按次序分別為：颱風利奧(9902)、颱風瑪姬(9903)、熱帶風暴(9906)、颱風森姆(9910)、熱帶風暴芸蒂(9914)、颱風約克(9915)、強烈熱帶風暴錦雯(9919)及颱風丹尼(9920)(圖2.3)。當中有四個橫過香港，它們是瑪姬、森姆、約克及錦雯(圖2.4)，這是近半個世紀以來的第一次。

受利奧的影響，歷來最早的三號及八號風球分別在四月三十日及五月二日懸掛。瑪姬導致天文台在六月七日需要懸掛歷來第二個最早的九號風球。在約克的吹襲下，天文台在九月十六日懸掛十號風球，這是繼一九八三年颱風愛倫以來的第一次。而該信號懸掛了11小時，是歷來的新紀錄。受約克的影響，橫瀾島在九月十六日錄得最高陣風達每小時234公里，這是該島的最高紀錄。

全年，熱帶氣旋警告信號共懸掛了520小時，這是一九七四年以來最長時間的。共有五個熱帶氣旋導致天文台需要懸掛八號或更高風球，平了一九六四年所創的紀錄。而一九七四及一九六四皆是「拉尼娜」現象活躍的一年。

森姆為香港帶來616.5毫米的雨量，這是一八八四年有記錄以來為香港帶來最多雨量的熱帶氣旋。一九九九年各熱帶氣旋為香港帶來的雨量(即該熱帶氣旋在出現於香港600公里範圍內至其消散或離開香港600公里範圍之後72小時期間，天文台錄得的雨量)總合共為1 231.2毫米。比年平均雨量741.0毫米(1961-1990)高百分之66。它佔該年總雨量2 129.1毫米的百分之58。

以下是一九九九年所有熱帶氣旋的回顧。各影響香港的熱帶氣旋的詳述刊於第三節內。

一九九九年的首個熱帶氣旋是熱帶低氣壓愛莉絲。它在二月十七日於馬尼拉東南偏東約1 150公里處形成。愛莉絲初時向西北偏西前進，它在二月十八日採取東北路徑移動並在翌日消散於海上。

*包括熱帶風暴戴娜(9911)這個在北太平洋中部形成而橫過國際更日線進入北太平洋西部的熱帶氣旋。

四月有兩個熱帶氣旋影響北太平洋西部及南海區域。其中颱風利奧(9902)導致天文台需要在五月二日懸掛八號東北烈風或暴風信號。這是自一九四六年以來最早懸掛的八號熱帶氣旋警告信號。

姬蒂(9901)在四月二十三日於馬尼拉東南偏東約580公里處發展為一熱帶低氣壓。它在太平洋上採取東北途徑移動並於四月二十五日增強為一強烈熱帶風暴。當姬蒂掠過硫黃島後，它在四月二十八日減弱為一熱帶風暴並於次日變為一溫帶氣旋。

利奧在四月二十八日於西沙島西南約170公里處形成為一熱帶低氣壓。它在南海以東北途徑移動，在四月三十日增強為一颱風。翌日利奧減弱為一強烈熱帶風暴。它採取西北路徑移動並在五月二日趨近香港。利奧在當日稍後時間拐彎遠離本港並且減弱為一熱帶低氣壓。它在五月二日晚上變為一低壓區並於大亞灣附近登陸。

六月只有一個熱帶氣旋，名為瑪姬(9903)，影響北太平洋西部及南海區域。受到瑪姬的影響，天文台在六月七日懸掛九號烈風或暴風風力增強信號。這是繼一九六一年五月颱風愛麗斯後，天文台最早懸掛的九號信號。

瑪姬在六月二日於太平洋上形成為一熱帶低氣壓，當時它位於馬尼拉東南偏東約1 070公里。瑪姬當日迅速增強為一熱帶風暴。它採取西北途徑移動，並在六月四日達到颱風強度。瑪姬在六月六日進入南海後，轉向西移動直趨華南沿岸。它在六月七日清晨在香港的西貢半島登陸並減弱為一強烈熱帶風暴。瑪姬由東北向西南橫過香港，然後沿着廣東西部沿海移動。它以逆時針方向打圈後在上川島附近登陸，並繼續移入內陸，在六月八日減弱為一低壓區。

七月共有五個熱帶氣旋影響北太平洋西部及南海區域。其中，一熱帶風暴(9906)引致天文台需要懸掛熱帶氣旋警告信號。

一低壓區在七月十五日於硫黃島東南偏東約1 380公里處發展為一熱帶低氣壓(9904)。它向西北移動，在七月十八日消散於海上。

另一熱帶低氣壓在七月二十一日於濟州東南約620公里處形成。這熱帶低氣壓向西北偏北移動，一日後它於該島掠過並隨即變為一溫帶氣旋。

尼爾(9905)在七月二十五日於沖繩島以南約480公里處形成為一熱帶低氣壓。它向東北偏北移動，在翌日迅速增強為一強烈熱帶風暴。尼爾轉趨向西北偏北移動，在七月二十七日掠過濟州並隨後減弱為一熱帶風暴。它橫過南韓西部沿岸後，在翌日減弱為一低壓區。

一低壓區在七月二十五日於香港西南偏南約500公里處發展為一熱帶低氣壓。它初時移動緩慢，但在翌日開始它採取東北途徑前進並同時增強為一熱帶風暴。這熱帶風暴向華南沿岸逼近時，為香港部份地區帶來強風。三號強風信號在七月二十六日晚上懸掛。這熱帶風暴在七月二十七日減弱為一熱帶低氣壓，並同時於汕頭附近登陸。隨後它在翌日消散於陸上。

奧嘉(9907)在七月二十九日於雅蒲島西北約440公里處發展為一熱帶低氣壓。它採取西北偏北途徑移動，在八月一日增強為一颱風後橫過沖繩島。奧嘉進入東海後，為日本南部帶來暴雨及山泥傾瀉，造成一名女子死亡。奧嘉在翌日採取偏北途徑移動，在八月三日於濟州附近掠過後減弱為一強烈熱帶風暴。當日它於漢城附近登陸並移入北韓。奧嘉在八月四日變為一低壓區。在南韓，奧嘉帶來的暴雨造成37人死亡，最少有26人失蹤及超過24 000人需要疏散。在北韓，受奧嘉的吹襲下，共有42人死亡，另有39 000人遭受洪水圍困。

除了奧嘉，八月還有六個熱帶氣旋集結在北太平洋西部及南海區域。其中颱風森姆(9910)為本年內導致天文台需要懸掛八號熱帶氣旋警告信號的第三個熱帶氣旋。而在一月至八月期

間懸掛了三次八號或更高風球的情況，今年也是繼一九七一年以來的第一次。森姆亦是自一八八四年有記錄以來為香港帶來最多雨量的熱帶氣旋。

保羅(9908)在八月三日於硫黃島西南偏南約540公里處形成為一熱帶低氣壓。它以西北路徑移動，在翌日增強為一熱帶風暴。保羅轉趨向西北偏西移動，掠過日本九州。它隨後在八月七日趨近濟州並且減弱為一熱帶低氣壓。在保羅的吹襲下，濟州交通一度受到影響。保羅在當晚減弱為一低壓區。

一熱帶低氣壓在八月六日於東沙島西北偏西約80公里處形成，定名為慧卓茹(9909)。慧卓茹以東北路徑移動，在八月七日橫過台灣中部。它在翌日趨近沖繩島，並消散於海上。

森姆在八月十九日於馬尼拉東北偏東約680公里處發展為一熱帶低氣壓。它在太平洋上採取西北偏西路徑移動，並增強為一熱帶風暴，在翌日掠過呂宋北部。森姆在八月二十一日於南海上加強為一強烈熱帶風暴並趨近東沙島。它以西北方向移動趨近廣東沿岸，在八月二十二日上午稍後時間達至颱風強度。隨後，森姆迅速減弱為一強烈熱帶風暴，並於黃昏時登陸香港。森姆其後橫過珠江口，在八月二十三日於廣東內陸逐漸減弱為一低壓區。

戴娜(9911)於北太平洋中部形成後，它在八月二十日橫過國際更日線進入北太平洋西部，當時它為一熱帶風暴。戴娜在太平洋上向西北推進，在八月二十二日減弱為一熱帶低氣壓並在翌日消散於海上。

泰妮亞(9912)在八月二十日於威克島東北約1 520公里處發展為一熱帶低氣壓。它向西北偏西移動，並在八月二十二日逐漸增強成為一強烈熱帶風暴。當日下午泰妮亞減弱為一熱帶風暴後，開始轉向北前進。它進一步減弱為一熱帶低氣壓並在八月二十三日變為一低壓區。

一熱帶低氣壓在八月二十五日於硫黃島西北偏北約80公里處形成，並命名為維賽爾(9913)。它初時採取東北偏東路徑移動，並在當日黃昏增強為一熱帶風暴。維賽爾在太平洋上緩慢移動，在八月二十八日消散於海上。

九月共有六個熱帶氣旋影響北太平洋西部及南海區域。其中芸蒂(9914)、約克(9915)及錦雯(9919)均引致天文台需要懸掛熱帶氣旋警告信號。颱風約克在九月十六日於香港登陸，天文台懸掛了自一九八三年以來的第一個十號颶風信號。強烈熱帶風暴錦雯亦於香港登陸，它是今年第五個引致天文台需要懸掛八號或更高風球的熱帶氣旋，今年亦是自一九六四年以來天文台第一次懸掛了五次八號或更高風球。

芸蒂在九月一日於馬尼拉東南偏東約660公里處發展為一熱帶低氣壓。它以西北偏北路徑移動，掠過呂宋最北部，並於九月二日晚上增強為一熱帶風暴。芸蒂在九月三日進入南海後，採取西北途徑移動，直趨廣東沿岸。它在九月四日早上於汕尾附近登陸，然後迅速變為一低壓區。

約克在九月十二日於馬尼拉東北約420公里處發展為一熱帶低氣壓。它向西移動，在當日橫過呂宋北部。當約克進入南海後，它的移動途徑變得不穩定。約克初時向北推進，在九月十四日變為一強烈熱帶風暴。它其後轉向西北移動，跟著幾乎停留不動，並在翌日晚上增強為一颱風。約克在九月十六日登陸香港。它橫過珠江口後，於珠海附近登陸，在翌日減弱為一低壓區。

思雅(9916)在九月十三日於硫黃島西北偏西約770公里處發展為一熱帶低氣壓。它向西北移動，並在翌日於九州附近增強為一熱帶風暴。思雅向東北推進，在九月十五日消散於本州。

安茵(9917)在九月十六日於沖繩島東北約280公里處發展為一熱帶低氣壓。它在當日下午迅速增強為一熱帶風暴。安茵在東海上向西推進，並於九月十八日轉向西北移動。安茵在九月十九日減弱為一熱帶低氣壓並消散於海上。

巴特(9918)在九月十九日於沖繩島東南偏南約510公里處發展為一熱帶低氣壓。它初時向西北移動，但在翌日變得緩慢移動並迅速增強為一颱風。巴特掠過硫球群島後，採取東北偏北路徑移動。它在九月二十四日橫過九州並進入日本海。巴特向著更高緯度推進，在當晚變為一溫帶氣旋。在日本，巴特釀成山泥傾瀉及水浸，最少有26人死亡及300人受傷，百多萬用戶的電力受到中斷，直接經濟損失約為數百億日圓。

一熱帶低氣壓在九月二十四日於香港以南約410公里處形成，定名為錦雯。錦雯初時在南海北部採取東北偏北路徑移動，隨後它變得緩慢移動，並在九月二十五日增強為一強烈熱帶風暴。錦雯在當日黃昏迅速減弱為一熱帶風暴，並轉向西北移動直趨香港。它在翌日中午前登陸。橫過香港後，錦雯隨即在當日下午減弱為一熱帶低氣壓並迅速變為一低壓區。

十月共有兩個熱帶氣旋影響北太平洋西部及南海區域。其中颱風丹尼(9920)引致天文台需要懸掛熱帶氣旋警告信號。

丹尼在十月三日於馬尼拉東北偏東約1 140公里處形成為一熱帶低氣壓。它初時向西北移動，在該晚增強為一熱帶風暴。丹尼隨後採取偏西途徑移動，在十月四日變為一強烈熱帶風暴。它繼續增強，在午夜時分達至颱風程度。丹尼在十月五日登陸呂宋北部，接著在當晚進入南海。它在十月六日移動緩慢，然後在翌日突轉向北推進，趨近福建沿岸。在十月八日晚上，丹尼的風眼在衛星雲圖上清晰可見。丹尼在十月九日早上於廈門附近登陸，跟著減弱，並於一日後在福州附近變為一低壓區。

一熱帶低氣壓在十月十七日於馬尼拉西北偏西約200公里處形成，定名為伊芙(9921)。伊芙迅速增強為一熱帶風暴，以大致偏西途徑移動趨向越南，及後在十月二十日於峴港附近登陸。伊芙隨即在當日減弱為一熱帶低氣壓並消散於陸上。

十一月共有兩個熱帶氣旋影響北太平洋西部及南海區域。

一熱帶低氣壓在十一月七日於馬尼拉東南偏東約1 050公里處形成，定名為法蘭基。法蘭基初時向西北偏西移動並在翌日登陸菲律賓。在十一月九日，它繞圈後折回太平洋，然後在十一月十日消散於海上。

姬羅莉亞(9922)在十一月十三日於沖繩島東南偏南約1 190公里處形成為一熱帶低氣壓。它在翌日迅速增強為一熱帶風暴。姬羅莉亞向東北推進，在十一月十五日於太平洋上進一步發展為一強烈熱帶風暴。翌日，它變為一溫帶氣旋。

十二月只有一個熱帶氣旋影響北太平洋西部及南海區域。

一熱帶低氣壓在十二月十四日於南沙島西北偏西約80公里處形成。它向西北偏西移動並在十二月十六日於越南南部登陸前減弱為一低壓區。

In 1999, only 26* tropical cyclones occurred over the western North Pacific and the South China Sea (i.e. the area bounded by the Equator, 45°N, 100°E and 180°). This was less than the 30-year (1961-1990) average of 31. Seven of 26 tropical cyclones attained typhoon intensity, or less than half of the 30-year annual average of 15.6 and close to the lowest record of six set in 1998. The monthly frequencies of first occurrence of tropical cyclones and that of typhoons for 1999 are shown in Figure 2.1. The 30-year monthly mean frequencies are shown in Figure 2.2.

Under the influence of an ongoing La Niña event, the tropical cyclones in 1999 over the western North Pacific formed mainly over the western part of the basin or at higher latitudes where waters were warmer. During the year, three tropical cyclones landed over Japan, four visited Korea and five crossed or passed close to the Philippines. Bart (9918) was the most intense typhoon in 1999. The maximum sustained winds and minimum sea-level pressure near its centre were estimated to be 195 km/h and 930 hPa respectively.

Eleven tropical cyclones affected the South China Sea in this year, of which six developed within the basin. Amongst them, eight landed over the south China coast and affected Hong Kong. Two others posed a threat to Vietnam and one crossed Taiwan.

Of the 26 tropical cyclones in 1999, 12 occurred within Hong Kong's area of responsibility (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E). This was less than the 30-year (1961-90) annual average of 16.4. Seven of these 12 tropical cyclones developed within the area. Altogether, 316 tropical cyclone warnings to ships and vessels were issued from the Hong Kong Observatory in 1999 (Table 4.2).

Due to La Niña, Hong Kong in 1999 had one of most unusual tropical cyclone seasons. Several new records were set.

The eight tropical cyclones affecting Hong Kong in the year were, in chronological order, Typhoon Leo (9902), Typhoon Maggie (9903), Tropical Storm (9906), Typhoon Sam (9910), Tropical Storm Wendy (9914), Typhoon York (9915), Severe Tropical Storm Cam (9919) and Typhoon Dan (9920) (Figure 2.3). Four of them, Maggie, Sam, York and Cam crossed Hong Kong (Figure 2.4). This was something without precedent in the past half a century.

Leo set the record for the earliest display of the No. 3 as well as the No. 8 signal, on 30 April and on 2 May respectively. The hoisting of the No. 9 signal on 7 June for Maggie was the second earliest for that signal. York caused the No. 10 signal to be raised for the first time since the passage of Typhoon Ellen in 1983. This signal was in force for 11 hours, another record. A maximum gust of 234 km/h recorded at Waglan on 16 September during the passage of York. This is the highest record on that island.

For the year, tropical cyclone warning signals were hoisted for a total of 520 hours, the longest since 1974. Five tropical cyclones necessitated the hoisting of the No. 8 or higher signals, equaling the record previously set in 1964. Both 1974 and 1964 were years coinciding with La Niña activity.

Sam brought 616.5 mm of rainfall to Hong Kong, the highest by a single tropical cyclone and making Sam the wettest tropical cyclone to affect Hong Kong since records began in 1884. Overall, tropical cyclone rainfall (defined as the total rainfall recorded at the Hong Kong Observatory from the time when a tropical cyclone was centred within 600 km of Hong Kong to 72 hours after it had dissipated or moved outside 600 km of Hong Kong) in 1999 was 1 231.2 mm, 66 % above the mean annual value of 741.0 mm (1961-1990) and accounting for some 58 % of the year's total rainfall of 2 129.1 mm.

A review of all the tropical cyclones in 1999 is given in the following paragraphs. Detailed reports on tropical cyclones affecting Hong Kong are presented in Section 3.

The first tropical cyclone of 1999 was a tropical depression named Iris. It formed about 1 150 km east-southeast of Manila on 17 February. Moving west-northwestwards at first, Iris recurved northeastwards on 18 February and dissipated over water the next day.

* including Tropical Storm Dora (9911) which formed over the central North Pacific and moved across the International Date Line into the western North Pacific.

Two tropical cyclones occurred over the western North Pacific and the South China Sea in April. One of these, Typhoon Leo (9902) necessitated the hoisting of the No. 8 NORTHEAST Gale or Storm Signal in Hong Kong on 2 May. This was the earliest No. 8 signal displayed since 1946.

Kate (9901) developed as a tropical depression about 580 km east-southeast of Manila on 23 April. It took on a northeastward course over the Pacific and then intensified into a severe tropical storm on 25 April. After skirting past Iwo Jima, Kate weakened into a tropical storm on 28 April and became an extratropical cyclone the next day.

Leo formed as a tropical depression about 170 km southwest of Xisha on 28 April. It tracked northeastwards over the South China Sea and intensified into a typhoon on 30 April. Leo weakened into a severe tropical storm the next day. It took on a northwestward course and approached Hong Kong on 2 May. Leo veered away on the late afternoon that day and weakened into a tropical depression. It then became an area of low pressure while making landfall near Daya Bay on the night of 2 May.

Only one tropical cyclone, namely Maggie (9903), occurred over the western North Pacific and the South China Sea in June. Maggie necessitated the hoisting of the Increasing Gale or Storm Signal No. 9 in Hong Kong on 7 June. Only on one previous occasion was the No. 9 signal hoisted earlier in the year - in May 1961 during the passage of Typhoon Alice.

Maggie formed as a tropical depression over the Pacific about 1 070 km east-southeast of Manila on 2 June. It intensified rapidly, becoming a tropical storm that day. Tracking northwestwards, Maggie attained typhoon strength on 4 June. Upon entering the South China Sea on 6 June, Maggie turned westwards towards the south China coast. It made landfall over the Sai Kung Peninsula of Hong Kong on the early morning of 7 June and weakened into a severe tropical storm. After traversing Hong Kong from northeast to southwest, Maggie skirted the coast of western Guangdong. It made landfall near Shangchuan Dao, having first executed an anticlockwise loop off the coast. Maggie then moved further inland and weakened into an area of low pressure on 8 June.

There were five tropical cyclones occurring over the western North Pacific and the South China Sea in July. Amongst them, one tropical storm (9906) necessitated the hoisting of tropical cyclone warning signals in Hong Kong.

An area of disturbance developed as a tropical depression (9904) about 1 380 km east-southeast of Iwo Jima on 15 July. Tracking northwestwards, it dissipated over water on 18 July.

Another tropical depression formed about 620 km southeast of Cheju on 21 July. Moving north-northwestwards, it skirted that island a day later and rapidly became an extratropical cyclone.

Neil (9905) formed as a tropical depression about 480 km south of Okinawa on 25 July. It moved north-northeastwards and intensified rapidly into a severe tropical storm the next day. Turning north-northwestwards, Neil skirted Cheju and then weakened into a tropical storm on 27 July. It passed the western coast of South Korea before weakening into an area of low pressure the next day.

An area of low pressure developed as a tropical depression about 500 km south-southwest of Hong Kong on 25 July. It drifted slowly at first but began moving northeastwards the next day, intensifying into a tropical storm at the same time. During its approach to the south China coast, the tropical storm brought strong winds to parts of Hong Kong and the Strong Wind Signal No. 3 was hoisted on the night of 26 July. The tropical storm weakened into a tropical depression on 27 July, at about the same time as it made landfall near Shantou. It then dissipated over land the next day.

Olga (9907) developed as a tropical depression about 440 km northwest of Yap on 29 July. Moving north-northwestwards, it intensified into a typhoon and then crossed Okinawa on 1 August. On entering the East China Sea, Olga brought heavy rain to southern Japan where landslides were triggered and one woman was killed. Olga took on a northward course the following day. It weakened into a severe tropical storm after passing near Cheju on 3 August. Olga made landfall near Seoul and moved into North Korea that day. It became an area of low pressure on 4 August. In South Korea, heavy rain associated with Olga resulted in 37 deaths. At least 26 others were reported missing and more than 24 000 had to be evacuated. In North Korea, the passage of Olga caused 42 deaths. Another 39 000 were also affected by floods.

Apart from Olga, there were six more tropical cyclones over the western North Pacific and the South China Sea in August. Amongst them, Typhoon Sam (9910) necessitated the hoisting of tropical cyclone warning signal No. 8 in Hong Kong, the third tropical cyclone to do so in the year. The last time that the No. 8 or higher signals had to be hoisted on three separate occasions between January and August was in 1971. Sam was also the wettest tropical cyclone to affect Hong Kong since records began in 1884.

Paul (9908) formed as a tropical depression about 540 km south-southwest of Iwo Jima on 3 August. It tracked northwestwards and intensified into a tropical storm the next day. Turning west-northwestwards, Paul crossed Kyushu in Japan. It then passed near Cheju and weakened into a tropical depression on 7 August. Transportation in Cheju was interrupted in the fury of Paul. Paul degenerated into an area of low pressure that night.

A tropical depression named Rachel (9909) developed about 80 km west-northwest of Dongsha Dao on 6 August. Tracking northeastwards, Rachel traversed central Taiwan on 7 August. It passed close to Okinawa and dissipated over water the next day.

Sam developed as a tropical depression about 680 km east-northeast of Manila on 19 August. Tracking west-northwestwards over the Pacific, Sam intensified into a tropical storm and swept across the northern part of Luzon the next day. Upon entering the South China Sea, Sam intensified into a severe tropical storm on 21 August. Moving northwestwards towards the coast of Guangdong, Sam attained typhoon strength on the late morning of 22 August. Weakening rapidly into a severe tropical storm, Sam made landfall over Hong Kong that evening. Sam then crossed the Zhujiang Kou (Pearl River Estuary) and weakened gradually into an area of low pressure over Guangdong on 23 August.

Dora (9911) formed over the central North Pacific. It crossed the International Date Line and entered the western North Pacific as a tropical storm on 20 August. Moving northwestwards over the Pacific, Dora weakened into a tropical depression on 22 August and dissipated over water the following day.

Tanya (9912) developed as a tropical depression about 1 520 km northeast of Wake Island on 20 August. It moved west-northwestwards and intensified gradually into a severe tropical storm on 22 August. After weakening into a tropical storm that afternoon, Tanya began to turn northwards. It further weakened into a tropical depression and became an area of low pressure on 23 August.

A tropical depression named Virgil (9913) formed about 80 km north-northwest of Iwo Jima on 25 August. It tracked east-northeastwards at first and intensified into a tropical storm that evening. Drifting slowly over the Pacific, Virgil dissipated over water on 28 August.

Six tropical cyclones occurred over the western North Pacific and the South China Sea in September. Amongst them, Wendy (9914), York (9915) and Cam (9919) necessitated the hoisting of tropical cyclone warning signals in Hong Kong. Typhoon York made landfall over Hong Kong on 16 September. On that day, the Hurricane Signal No. 10 was displayed for the first time since 1983. Severe Tropical Storm Cam also landed over Hong Kong and it was the fifth tropical cyclone necessitating the hoisting of No. 8 or higher signals this year. The last time that No. 8 or higher signals had to be hoisted on five separate occasions was in 1964.

Wendy developed as a tropical depression about 660 km east-southeast of Manila on 1 September. Tracking north-northwestwards, Wendy skirted the northern tip of Luzon and intensified into a tropical storm on the night of 2 September. Upon entering the South China Sea on 3 September, Wendy adopted a northwestward course and headed towards the coast of Guangdong. It made landfall near Shanwei on the morning of 4 September and then degenerated rapidly into an area of low pressure.

York developed as a tropical depression about 420 km northeast of Manila on 12 September. It tracked westwards and swept across the northern part of Luzon that day. Entering the South China Sea, York's movement became erratic. Heading north at first, York became a severe tropical storm on 14 September. It then turned northwestwards before becoming almost stationary and attaining typhoon strength the following night. York made landfall over Hong Kong on 16 September. After traversing Zhujiang Kou (Pearl River Estuary), York landed over Zhuhai and weakened into an area of low pressure the next day.

Zia (9916) formed as a tropical depression about 770 km west-northwest of Iwo Jima on 13 September. Moving northwestwards, it intensified into a tropical storm near Kyushu the next day. Zia headed northeastwards and dissipated over Honshu on 15 September.

Ann (9917) developed as a tropical depression about 280 km northeast of Okinawa on 16 September. It intensified rapidly into a tropical storm that afternoon. Tracking westwards over the East China Sea, Ann turned northwestwards on 18 September. Ann weakened into a tropical depression and dissipated over water on 19 September.

Bart (9918) formed as a tropical depression about 510 km south-southeast of Okinawa on 19 September. It first headed northwestwards but became slow-moving while intensifying rapidly into a typhoon the next day. After sweeping across the Ryukyu Islands, Bart adopted a north-northeastward course. It passed Kyushu and entered the Sea of Japan on 24 September. Moving into higher latitudes, Bart became an extratropical cyclone that night. Bart triggered off landslides and caused flooding in Japan. At least 26 people were killed and 300 were injured. Power supply to over a million households was cut off. Direct economic losses were estimated at tens billion Yen.

A tropical depression named Cam developed about 410 km south of Hong Kong on 24 September. Cam took on a north-northeastward course over the northern part of the South China Sea at first. It then slowed down and became a severe tropical storm on 25 September. Cam rapidly weakened into a tropical storm that evening and turned northwestwards heading towards Hong Kong. It made landfall before noon the next day. After traversing Hong Kong, Cam briefly weakened into a tropical depression and degenerated into an area of low pressure that afternoon.

Two tropical cyclones occurred over the western North Pacific and the South China Sea in October. One of these, Typhoon Dan (9920), necessitated the hoisting of tropical cyclone warning signals in Hong Kong.

Dan developed into a tropical depression about 1 140 km east-northeast of Manila on 3 October. Tracking northwestwards at first, Dan intensified into a tropical storm that night. After taking on a westward course, Dan became a severe tropical storm on 4 October. It continued to intensify and attained typhoon strength at around midnight. Dan made landfall on 5 October over the northern part of Luzon and entered the South China Sea that night. It slowed down on 6 October and abruptly turned northwards the next day, edging towards the coast of Fujian. Dan's eye became well defined on satellite imagery on the night of 8 October. After making landfall near Xiamen on the morning of 9 October, Dan weakened and degenerated into an area of low pressure near Fuzhou the next day.

A tropical depression named Eve (9921) formed about 200 km west-northwest of Manila on 17 October. After intensifying into a tropical storm, Eve headed almost westwards for Vietnam and then made landfall near Da Nang on 20 October. Eve weakened rapidly into a tropical depression and dissipated over land that day.

Two tropical cyclones occurred over the western North Pacific and the South China Sea in November.

A tropical depression named Frankie formed about 1 050 km east-southeast of Manila on 7 November. Frankie tracked west-northwestwards at first and made landfall over the Philippines the next day. It made a loop on 9 November and began tracking back towards the Pacific. Frankie dissipated over water on 10 November.

Gloria (9922) developed into a tropical depression about 1 190 km south-southeast of Okinawa on 13 November. It intensified rapidly into a tropical storm the next day. Recurving towards the northeast, Gloria strengthened further into a severe tropical storm over the Pacific on 15 November. It became an extratropical cyclone the next day.

Only one tropical cyclone occurred over the western North Pacific and the South China Sea in December.

A tropical depression formed about 80 km west-northwest of Nansha Dao on 14 December. Moving west-northwestwards, it weakened into an area of low pressure just before making landfall over southern Vietnam on 16 December.

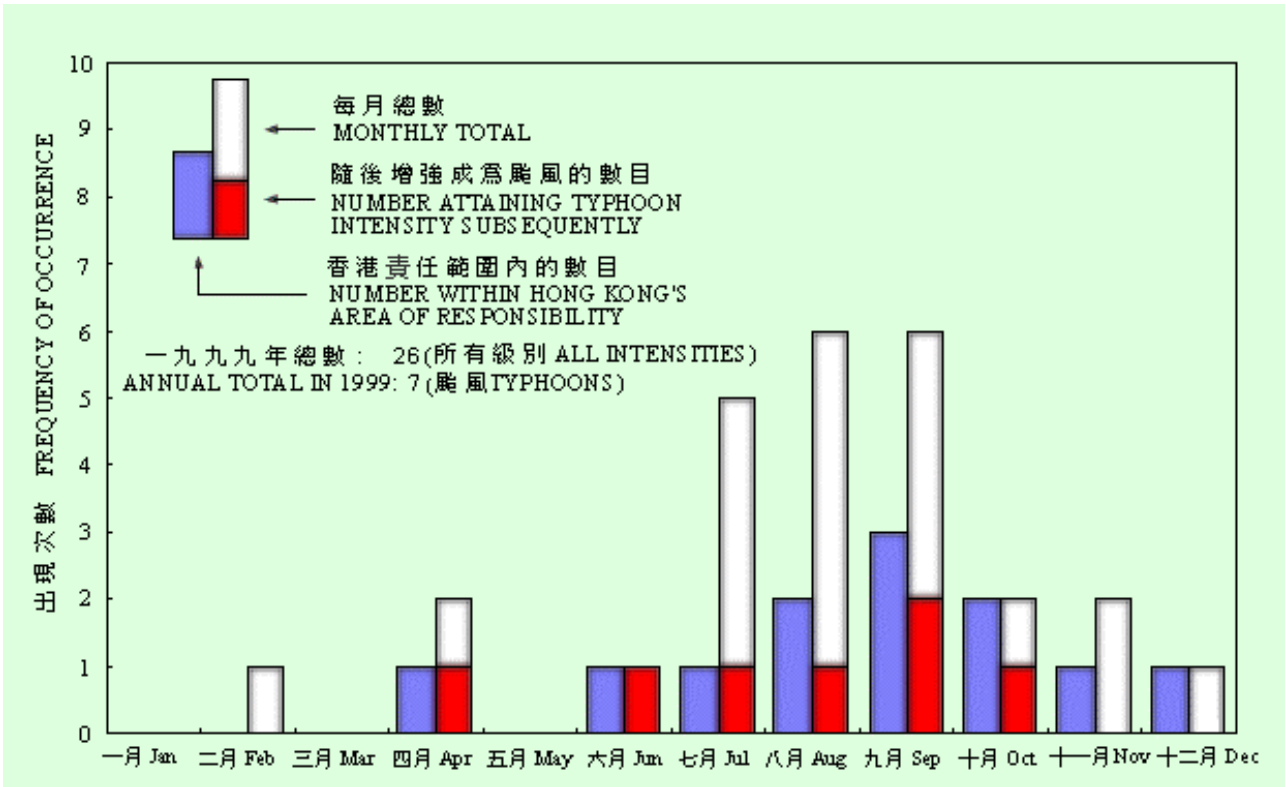


圖 2.1 一九九九年於北太平洋西部及南海區域的熱帶氣旋出現次數之每月分佈。
 Figure 2.1 Monthly frequencies of first occurrence of tropical cyclones in the western North Pacific and the South China Sea in 1999.

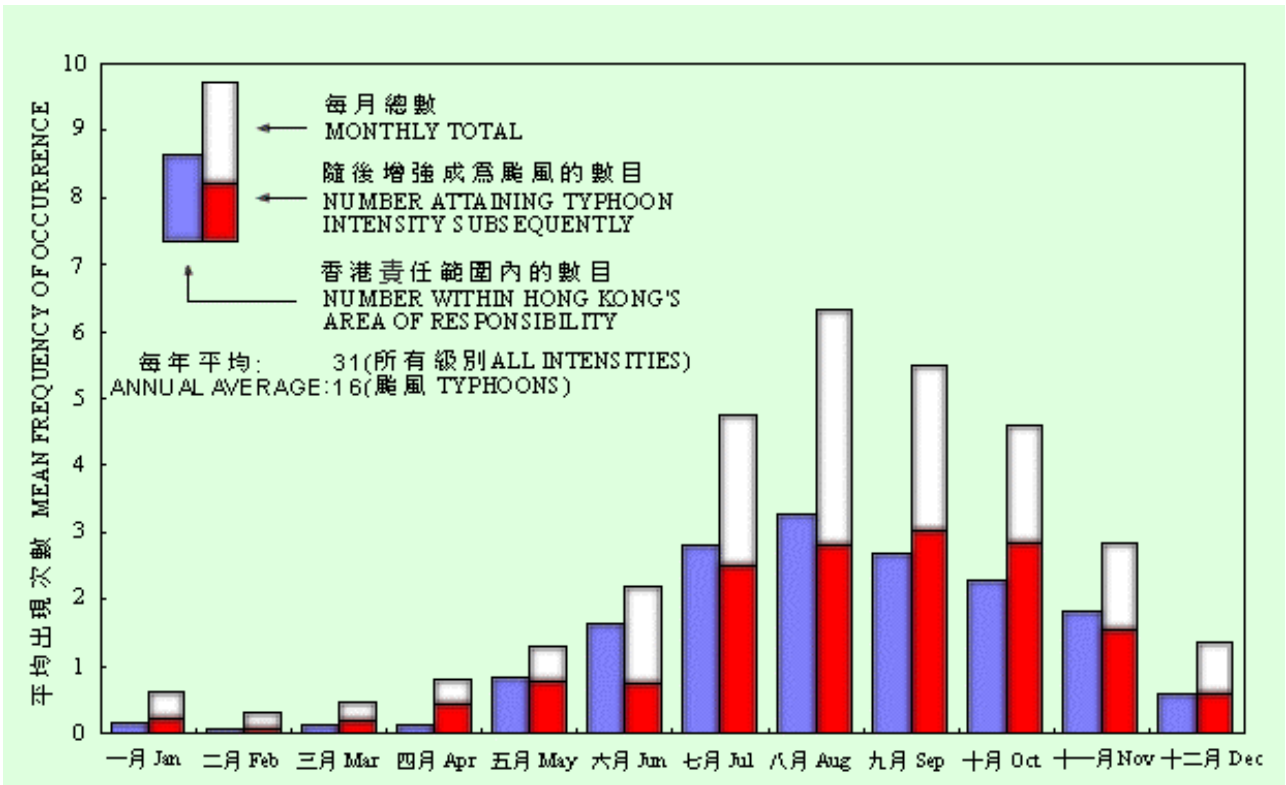


圖 2.2 一九六一至一九九零年間於北太平洋西部及南海區域的熱帶氣旋平均出現次數之每月分佈。
 Figure 2.2 Monthly mean frequencies of first occurrence of tropical cyclones in the western North Pacific and the South China Sea, 1961-1990.

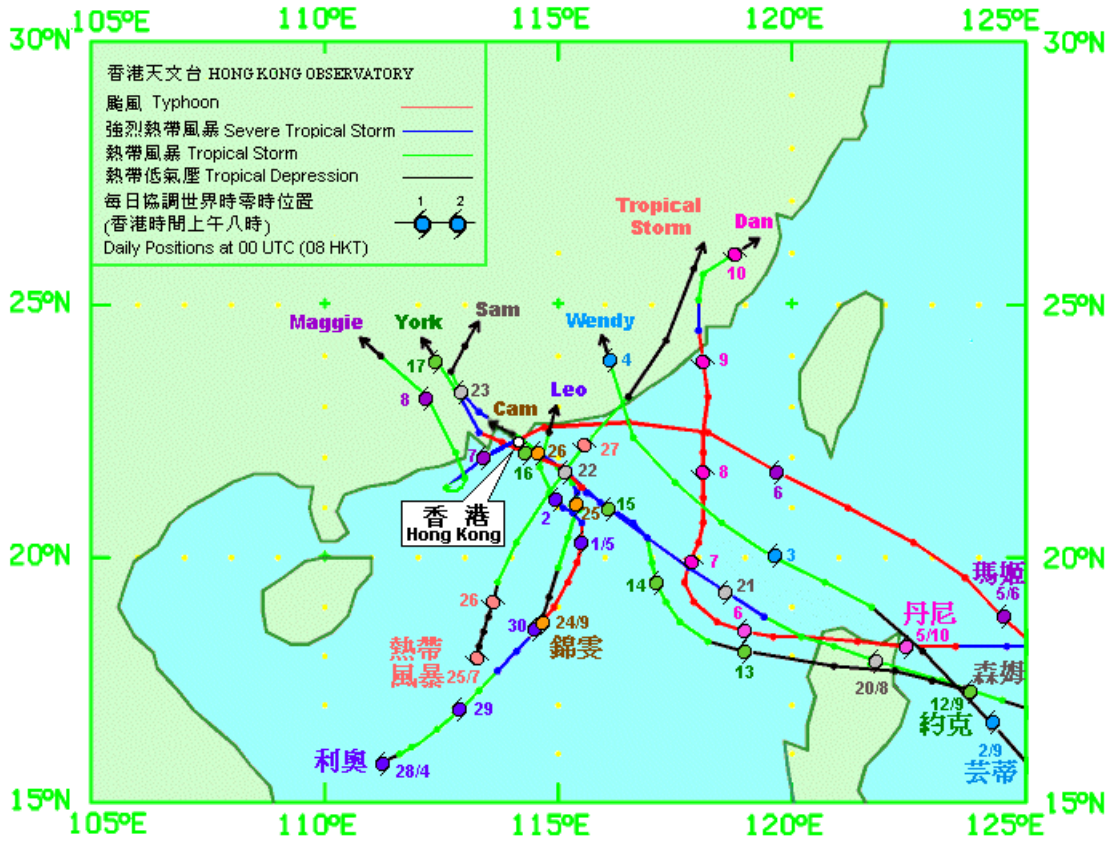


圖 2.3 一九九九年八個影響香港的熱帶氣旋的路徑圖。
Figure 2.3 Tracks of the eight tropical cyclones affecting Hong Kong in 1999.

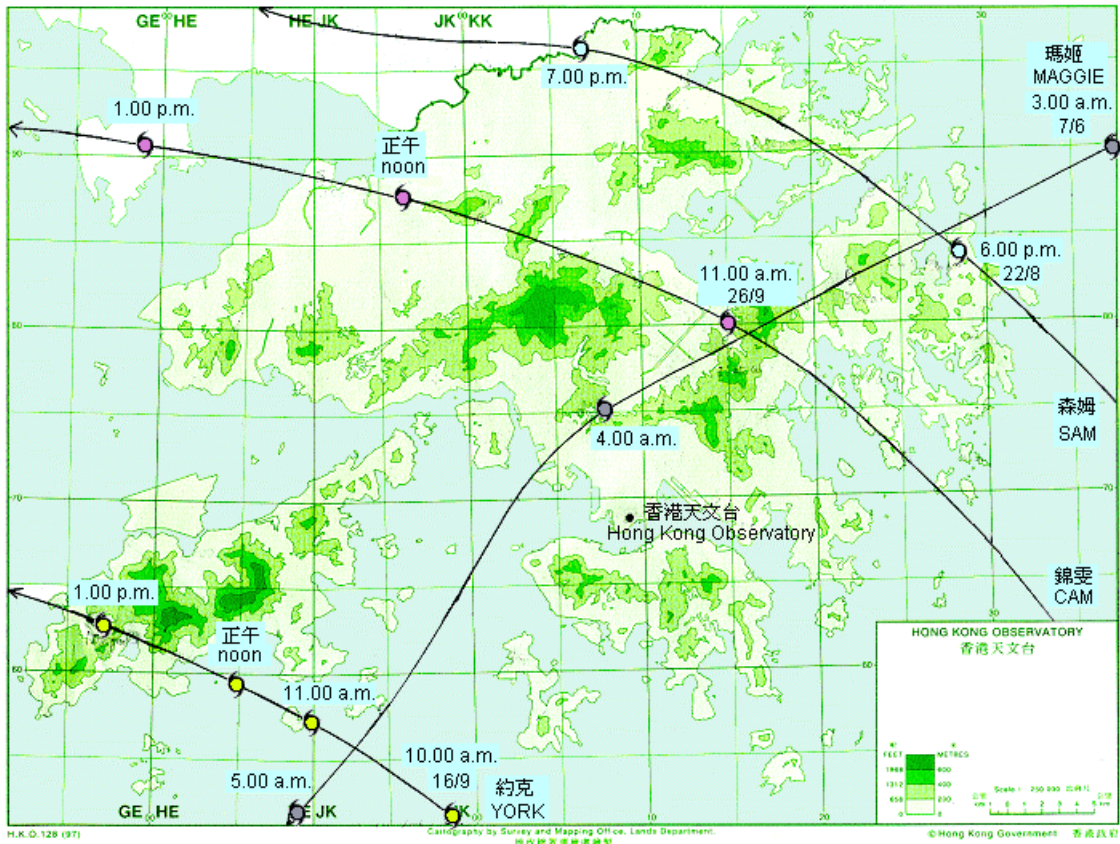










圖 2.4 一九九九年四個橫過香港的熱帶氣旋的路徑圖。
Figure 2.4 Tracks of the four tropical cyclones over Hong Kong in 1999.

表 2.1 香港各熱帶氣旋警告信號之意義

TABLE 2.1 MEANING OF ALL TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG

信號 Signal		顯示 Display		信號之意義 Meaning of the Signal
		符號 Symbol	燈號 Lights	
戒備 Standby	1		白 White 白 White 白 White	有一熱帶氣旋集結於香港約800公里之範圍內，稍後可能影響香港。 A tropical cyclone is centred within about 800 kilometres (km) of Hong Kong and may later affect Hong Kong.
強風 Strong Wind	3		綠 Green 白 White 綠 Green	維多利亞港內吹強風或將有強風，持續風力每小時41-62公里，陣風可能超過每小時110公里。 Strong wind is expected or blowing in the Victoria harbour, with a sustained speed of 41-62 kilometres per hour (km/h), and gusts which may exceed 110 km/h.
西北 烈風或暴風 NW'LY Gale or Storm	8 西北 NW		白 White 綠 Green 綠 Green	維多利亞港內風力已達或將達每小時63-117公里之烈風或暴風程度，由所指之方向吹襲，而陣風可能超過每小時180公里。 Gale or storm force wind is expected or blowing in the Victoria harbour, with a sustained wind speed of 63-117 km/h from the quarter indicated and gusts which may exceed 180 km/h.
西南 烈風或暴風 SW'LY Gale or Storm	8 西南 SW		綠 Green 白 White 白 White	
東北 烈風或暴風 NE'LY Gale or Storm	8 東北 NE		綠 Green 綠 Green 白 White	
東南 烈風或暴風 SE'LY Gale or Storm	8 東南 SE		白 White 白 White 綠 Green	
烈風或暴風 風力增強 Increasing Gale or Storm	9		綠 Green 綠 Green 綠 Green	
颶風 Hurricane	10		紅 Red 綠 Green 紅 Red	風力已達或將達颶風程度。即持續風力每小時118公里或以上，而陣風可能超過每小時220公里。 Hurricane force wind is expected or blowing, with sustained speed reaching upwards from 118 km/h and with gusts that may exceed 220 km/h.

第三節

一九九九年影響香港的熱帶氣旋

Section 3

**TROPICAL CYCLONES
AFFECTING HONG KONG IN 1999**

3.1

颱風利奧(9902)
四月二十八日至五月二日

一熱帶低氣壓在四月二十八日於西沙島西南約170公里處形成，定名為利奧。它在南海以東北途徑移動，並在當日下午增強為一熱帶風暴，兩日後利奧進一步發展成為一颱風。它在五月一日開始減弱為一強烈熱帶風暴並移向廣東沿岸海域。利奧隨後以西北途徑趨近香港，但在五月二日下午稍後時間拐彎遠離本港。利奧減弱為一熱帶低氣壓後便在當晚於大亞灣附近登陸並變為一低壓區。

在本港，一號戒備信號在四月二十九日上午9時40分懸掛。當時利奧位於香港西南偏南約600公里處。利奧在四月三十日增強為一颱風。受利奧及東北季候風的共同影響，本港離岸海域及高地吹強風，海面風浪亦頗大。天文台於四月三十日下午4時15分改掛三號強風信號。利奧在隨後兩日繼續威脅香港。在五月二日，橫瀾島風力增強並在中午前已吹烈風，以及利奧仍是一個相當有組織的熱帶風暴並預期會非常接近本港，所以天文台在該日下午1時30分懸掛八號東北烈風或暴風信號。這是自一九四六年以來最早懸掛八號熱帶氣旋警告信號的一次。

橫瀾島在五月二日錄得最高每小時平均風速為90公里，最高陣風則達每小時130公里。利奧在下午5時左右最接近本港，當時它位於香港東南偏東約45公里處，香港天文台總部亦在那時候錄得最低每小時海平面氣壓為1 004.7百帕斯卡。利奧然後轉往東北方向移動遠離本港並減弱為一熱帶低氣壓。天文台在下午5時30分改掛三號強風信號。隨著利奧繼續減弱及進一步離開，所有熱帶氣旋警告信號在當日晚上8時45分除下。

受利奧的影響，香港有六宗大樹倒塌的報告。三名男子在海上遇險獲救及一婦人在柴灣滑倒而受輕傷。路滑亦導致13人分別在三宗交通意外中受傷。大部份渡輪服務在利奧的吹襲下亦曾一度停航。兩班飛往香港及曼谷的航機被迫要取消。港島有五個泳灘的防鯊網被大浪吹致毀壞不堪。

在香港以外離橫瀾島約275公里處一艘貨輪遇到風浪而於四月三十日沉沒。一船員死亡，13人失蹤。其餘七人在巨浪中獲救。

表3.1.1-3.1.3分別是當利奧影響香港時各站所錄得風、雨量及潮汐資料。圖3.1.1-3.1.3分別是利奧的路徑圖、香港的雨量分佈及衛星雲圖。



3.1

Typhoon Leo (9902)
28 April - 2 May 1999

A tropical depression named Leo developed about 170 km southwest of Xisha Dao on 28 April. Tracking northeastwards over the South China Sea, Leo intensified into a tropical storm that afternoon and attained typhoon strength two days later. Leo started to weaken into a severe tropical storm on 1 May while moving towards the coastal waters of Guangdong. It approached Hong Kong on a northwestward course but veered away in the late afternoon on 2 May. Leo weakened into a tropical depression and then became an area of low pressure that night and made landfall near Daya Bay.

In Hong Kong the Standby Signal No. 1 was hoisted at 9.40 a.m. on 29 April when Leo was about 600 km to the south-southwest. Leo intensified into a typhoon on 30 April. Under the combined effect of

Leo and the northeast monsoon, winds were strong offshore and on high ground. Sea conditions also became rough. The Strong Wind Signal No. 3 was hoisted at 4.15 p.m. on 30 April. Leo continued to pose a threat to Hong Kong during the next two days. With winds increasing and reaching gale force at Waglan Island on the morning of 2 May and with Leo being a well-organized tropical storm which is expected to come very close to Hong Kong, the No. 8 NORTHEAST Gale or Storm Signal was hoisted at 1.30 p.m. that day. This was the earliest No. 8 signal displayed since 1946.

A maximum hourly wind of 90 km/h and a maximum gust of 130 km/h were recorded at Waglan Island on 2 May. Leo was closest to Hong Kong at around 5 p.m. on that day when it was about 45 km to the east-southeast. The lowest hourly sea-level pressure of 1 004.7 hPa was recorded at the Hong Kong Observatory Headquarters at that time. Leo then began to turn northeast moving away from Hong Kong and weakening into a tropical depression. The No. 8 Signal was thus replaced by the Strong Wind Signal No. 3 at 5.30 p.m. Leo continued to weaken and move further away. All tropical cyclone warning signals were lowered at 8.45 p.m. that night.

During the passage of Leo, six reports of fallen trees were received. Three men got into trouble in heavy seas but were all rescued. One woman sustained minor injuries when she slipped in Chai Wan. Slippery roads also caused 13 injuries in three separate traffic accidents. Most ferry services were suspended and two flights between Bangkok and Hong Kong were cancelled in the fury of Leo. Shark prevention nets at five beaches in Hong Kong Island were severely damaged by rough seas.

Outside Hong Kong, high waves associated with Leo caused a vessel to sink about 275 km off Waglan Island on 30 April. One sailor drowned, 13 were reported missing and another seven were rescued in the raging sea.

Information on wind, rainfall and tide during the passage of Leo is given in Tables 3.1.1-3.1.3. Figures 3.1.1 - 3.1.3 show respectively the track of Leo, rainfall distribution in Hong Kong and satellite imageries.

表 3.1.1 在利奧影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.1.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of tropical cyclone warning signals for Leo

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time		
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)				
中環	Central	東北偏東	ENE	58	1/5	0909	東	E	25	30/4	1100
中環廣場	Central Plaza	東北偏北	NNE	103	2/5	1102	東北偏北	NNE	65	2/5	1100
赤鱗角 (機場)	Chek Lap Kok (Airport)	東北偏北	NNE	59	1/5	0930	東北偏北	NNE	27	1/5	0700
長洲	Cheung Chau	北	N	81	1/5	1556	東北偏北	NNE	49	1/5	0800
長沙灣	Cheung Sha Wan	東北偏東	ENE	54	2/5	1024	北	N	16	1/5	1800
青洲	Green Island	東北偏東	ENE	76	29/4	2323	東北偏東	ENE	59	29/4	2400
京士柏	King's Park	東北偏北	NNE	67	2/5	0625	東北偏北	NNE	27	2/5	1000
流浮山	Lau Fau Shan	東北偏北	NNE	51	1/5	1139	西北偏北	NNW	30	2/5	1700
西貢	Sai Kung	東北偏北	NNE	96	2/5	1009	東北偏北	NNE	56	2/5	1000
沙螺灣	Sha Lo Wan	東北偏東	ENE	59	1/5	1132	東北	NE	34	1/5	1200
沙田	Sha Tin	北	N	47	1/5	1933	東北偏北	NNE	16	1/5	2100
石崗	Shek Kong	東北偏北	NNE	54	30/4	0034	東北	NE	22	30/4	1100
天星碼頭	Star Ferry	東	E	58	1/5	0501	西北偏西	WNW	25	2/5	2000
打鼓嶺	Ta Kwu Ling	西北偏北	NNW	40	1/5	1050	北	N	22	1/5	1200
大尾篤	Tai Mei Tuk	北	N	81	1/5	0535	北	N	47	1/5	0600
塔門	Tap Mun	東北	NE	75	2/5	1127	東北	NE	38	2/5	1200
大老山	Tate's Cairn	東北	NE	126	2/5	0819	東北	NE	81	1/5	0600
將軍澳	Tseung Kwan O	東北偏北	NNE	76	2/5	1014	東北	NE	27	2/5	1000
青衣	Tsing Yi	東北偏東	ENE	76	29/4	1730	東北偏北	NNE	31	1/5	1800
屯門	Tuen Mun	東北偏北	NNE	52	1/5	1336	東北偏北	NNE	19	29/4	1500
		東北偏北	NNE	19			東北偏北	NNE	19	29/4	1600
橫瀾島	Waglan Island	東北偏北	NNE	130	2/5	1204	東北偏北	NNE	90	2/5	1300

表 3.1.2 利奧影響香港期間，香港天文台及其他各站所錄得的日雨量(單位為毫米)

Table 3.1.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Leo

站(參閱圖 3.1.2) Station (see Fig. 3.1.2)	四月二十九日 29 Apr	四月三十日 30 Apr	五月一日 1 May	五月二日 2 May	總雨量 Total
香港天文台 Hong Kong Observatory	58.9	1.9	5.7	9.6	76.1
H13 半山區 Mid-levels	76.0	[3.0]	7.5	10.5	[97.0]
H19 筲箕灣 Shau Kei Wan	84.0	[3.0]	8.5	11.0	[106.5]
H21 淺水灣 Repulse Bay	72.5	[2.0]	3.5	11.0	[89.0]
K06 長沙灣 Cheung Sha Wan	42.0	[3.5]	8.0	25.0	[78.5]
N05 粉嶺 Fanling	2.0	[2.5]	11.0	9.5	[25.0]
N09 沙田 Sha Tin	16.5	[4.0]	6.5	25.0	[52.0]
N12 元朗 Yuen Long	3.0	[5.5]	12.0	6.0	[26.5]
N13 糧船灣 High Island	39.0	[5.5]	14.5	19.0	[78.0]
N17 東涌 Tung Chung	21.5	[3.5]	7.0	1.5	[33.5]
R21 踏石角 Tap Shek Kok	9.0	5.0	[11.0]	2.0	[27.0]
R26 石崗 Shek Kong	4.0	3.5	[15.0]	11.5	[34.0]
R31 大尾篤 Tai Mei Tuk	5.5	2.0	[10.0]	9.5	[27.0]

註： [] 基於不完整的每小時雨量數據。

Note : [] based on incomplete hourly data.

表 3.1.3 利奧影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

Table 3.1.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of Leo

站(參閱圖 1.1) Station (see Fig. 1.1)	最高潮位(海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮(天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度(米) Height (m)	日期/月份 Date/Month	時間 Time	高度(米) Height (m)	日期/月份 Date/Month	時間 Time
樂安排 Lok On Pai	2.66	2/5	10.14 a.m.	0.66	2/5	5.04 a.m.
鯽魚涌 Quarry Bay	2.75	2/5	10.19 a.m.	0.74	2/5	5.48 a.m.
大埔滘 Tai Po Kau	2.72	2/5	10.51 a.m.	0.89	2/5	6.12 a.m.
尖鼻咀 Tsim Bei Tsui	2.80	1/5	10.31 a.m.	0.68	2/5	7.54 a.m.

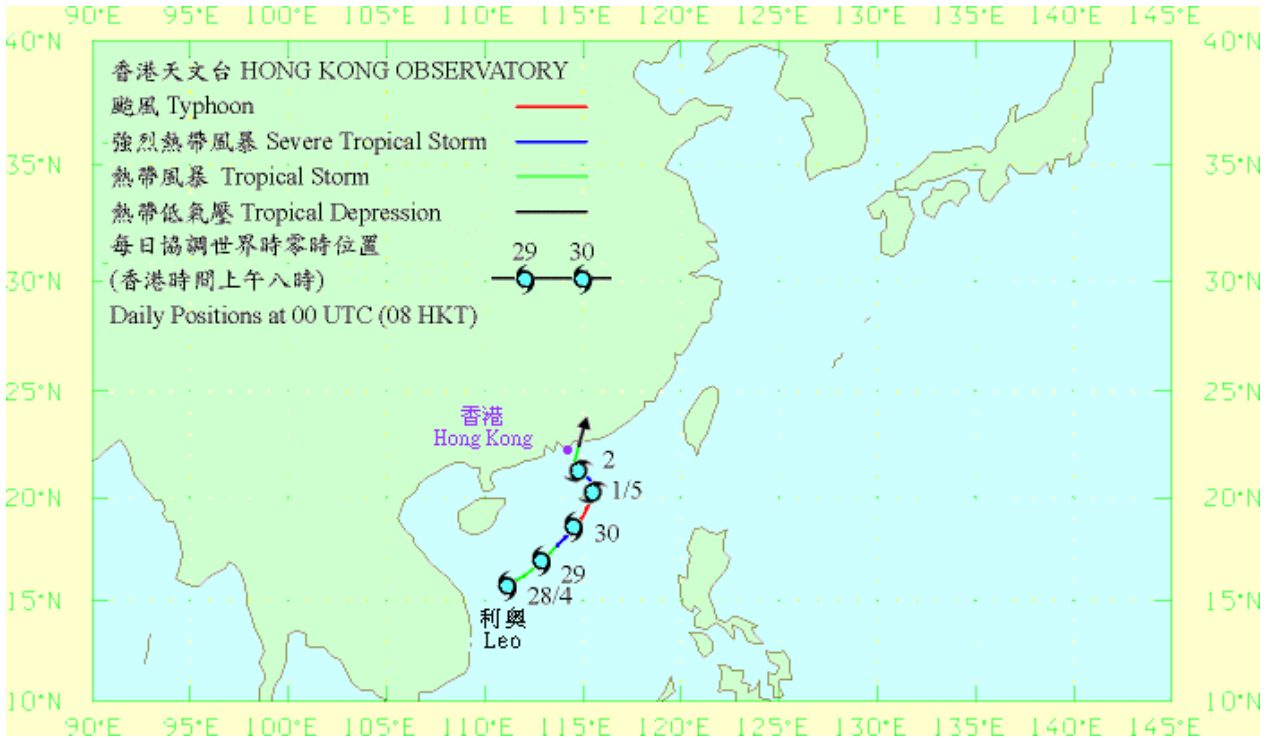


圖 3.1.1 一九九九年四月二十八日至五月二日颱風利奧 (9902) 的路徑圖。

Figure 3.1.1 Track of Typhoon Leo (9902) : 28 April - 2 May 1999.

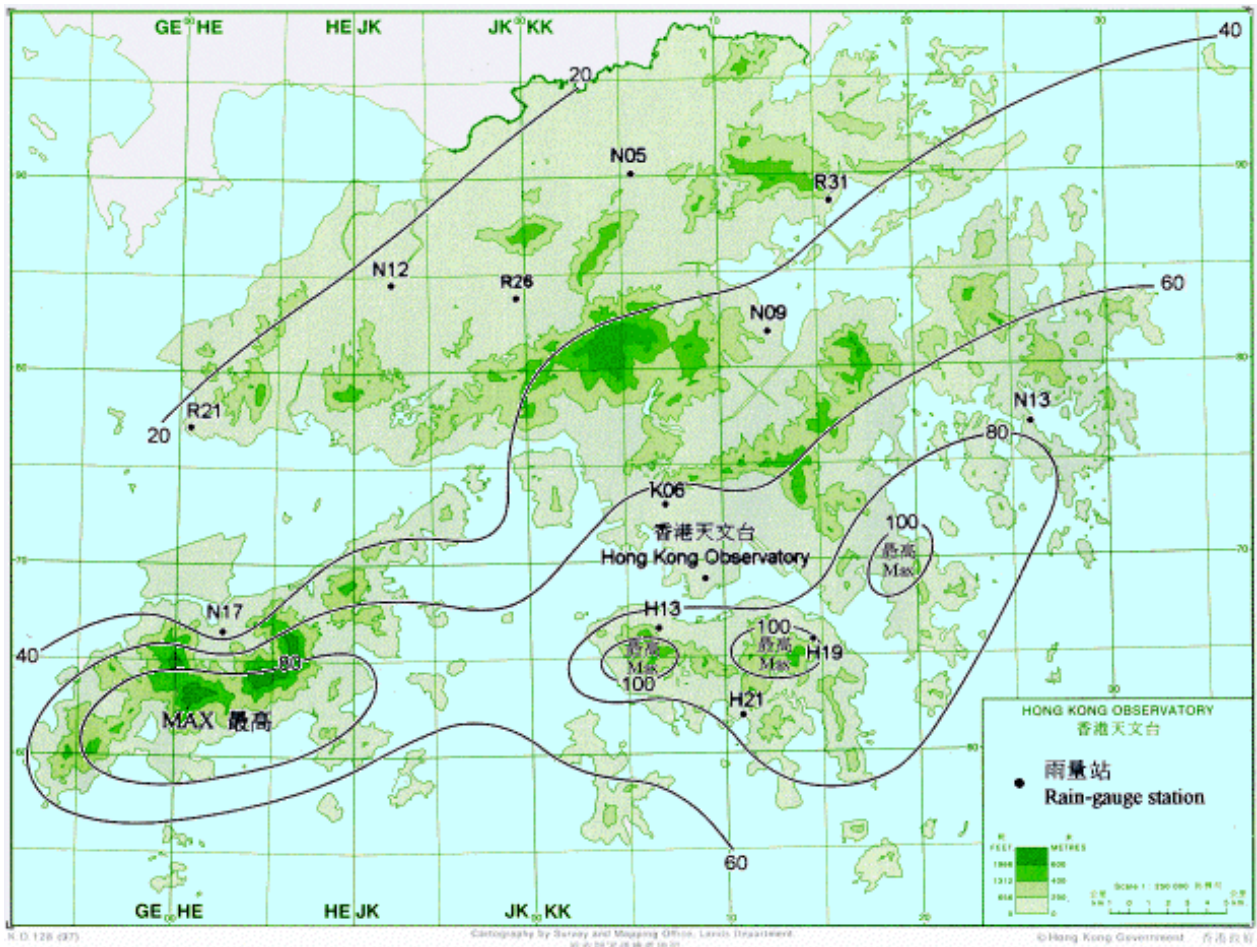


圖 3.1.2 一九九九年四月二十九日至五月二日的雨量分佈圖。

Figure 3.1.2 Rainfall distribution on 29 April – 2 May 1999.

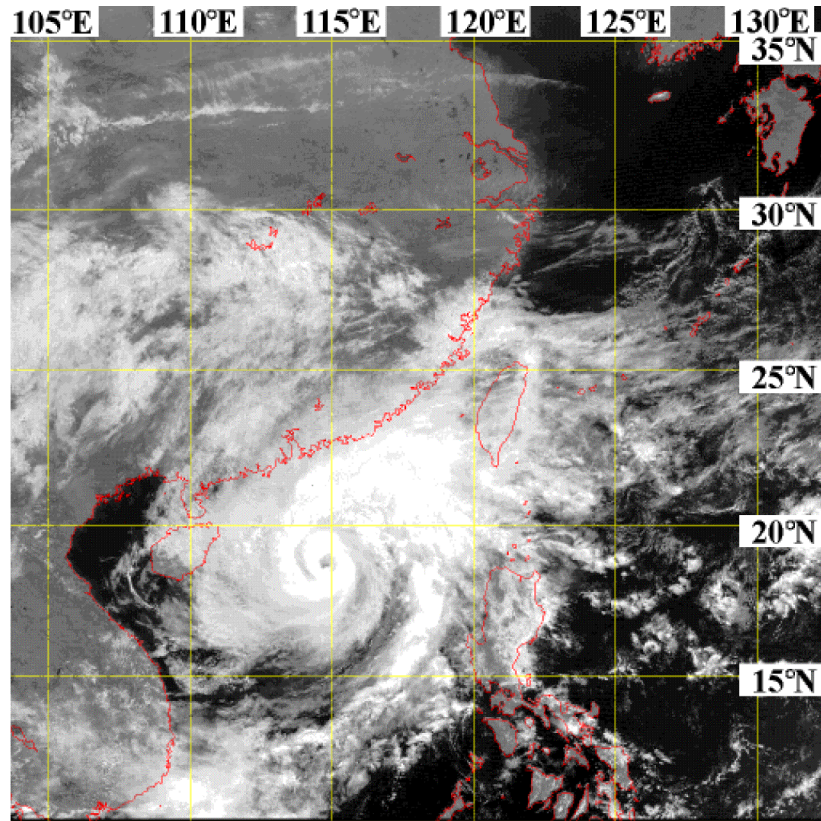


圖 3.1.3.a 一九九九年四月三十日約上午11時利奧的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.1.3.a Visible imagery of Leo at around 11 a.m. on 30 April 1999
 (originally captured by GMS-5 of JMA).

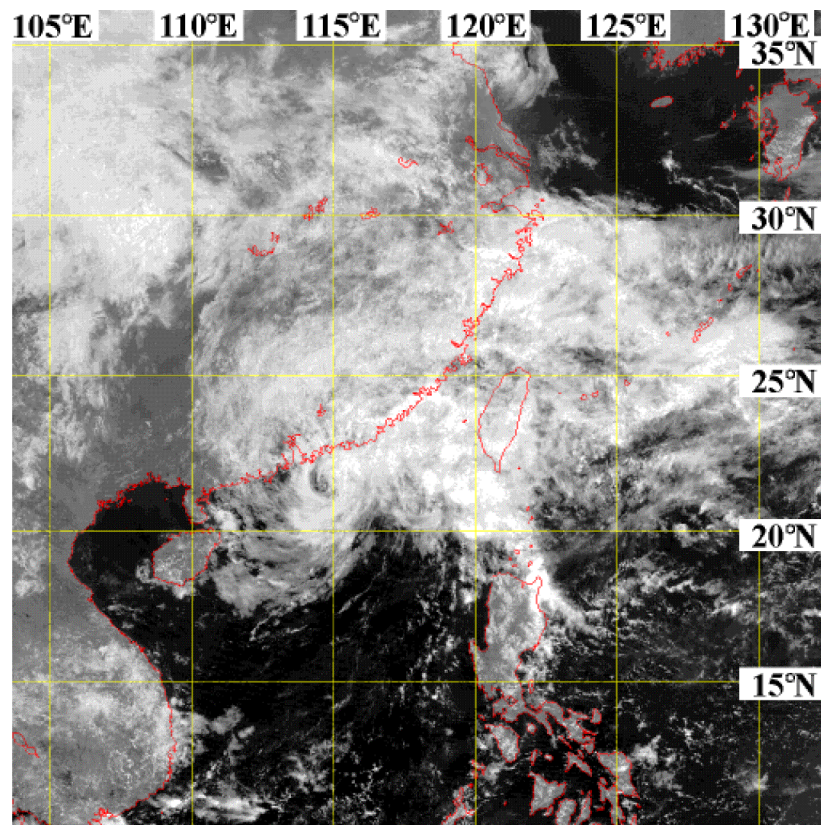


圖 3.1.3.b 一九九九年五月二日約上午11時利奧的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.1.3.b Visible imagery of Leo at around 11 a.m. on 2 May 1999
 (originally captured by GMS-5 of JMA).

3.2

颱風瑪姬(9903)
六月二日至八日

在六月二日早上，瑪姬在太平洋上形成爲一熱帶低氣壓，當時它位於馬尼拉東南偏東約1070公里處。瑪姬當日迅速增強爲一熱帶風暴，在翌日採取西北途徑移動並且繼續增強爲一強烈熱帶風暴。瑪姬在六月四日達至颱風強度，直趨巴斯海峽。受到瑪姬的環流影響，菲律賓有三人死亡及兩人受傷。在台灣，瑪姬造成兩人死亡及五人失蹤。超過100 000用戶的電力受到中斷。農作物的損失約爲新台幣5.96億元。

瑪姬在六月六日進入南海，並轉向西移動直趨華南沿岸。它於六月七日的清晨在香港登陸及減弱爲一強烈熱帶風暴。掠過香港後，瑪姬沿著廣東西部沿海移動並逐漸減弱爲一熱帶風暴。它先在上川島離岸以逆時針方向打圈，然後在當晚於該島附近登陸。瑪姬繼續移入內陸，在六月八日減弱爲一低壓區。瑪姬在廣東造成四人死亡，超過3 200間房屋及120艘船隻受毀或受到破壞，直接經濟損失約爲12億元人民幣。

在香港，一號戒備信號在六月五日晚上11時45分懸掛。當時瑪姬位於香港東南偏東約800公里處。瑪姬在六月六日繼續移近香港，本地偏北風也增強，因此三號強風信號在該日下午2時15分懸掛。當晚，瑪姬進一步逼近本港，因預料風力也會達至烈風程度，八號西北烈風或暴風信號在六月七日零時30分懸掛。由於瑪姬登陸香港在即及本地風力繼續增強，九號烈風或暴風風力增強信號在該日凌晨2時45分懸掛。

瑪姬在九號信號懸掛後約半小時在香港的西貢半島登陸。它以每小時約30公里的速度由東北向西南橫過香港然後移到香港離岸海域。瑪姬於清晨4時左右最接近香港天文台總部，當時它位於天文台西北面約5公里處。瑪姬襲港期間，香港有狂風大雨。除大帽山外，沙螺灣風力最強，所錄得最高每小時平均風速爲79公里，最高陣風則達每小時117公里。瑪姬掠過時，近其中心的風力和氣壓都瞬時下跌，各站錄得的最低瞬時海平面氣壓如下：-

站	最低瞬時海平面氣壓	時間	日期/月份
香港天文台總部	980.8百帕斯卡	上午 3 時 50 分	7/6
沙田	977.1百帕斯卡	上午 3 時 40 分	7/6
京士柏	980.6百帕斯卡	上午 3 時 53 分	7/6
長洲	981.2百帕斯卡	上午 4 時 29 分	7/6

瑪姬離港後，本港轉吹東至東北風。天文台在六月七日上午5時45分改掛八號東北烈風或暴風信號。隨著瑪姬的遠離，本地風勢開始減弱。天文台在該日上午10時30分轉掛三號強風信號，並於下午2時45分除下所有熱帶氣旋警告信號。

瑪姬在上川島離岸打圈後一度再次接近本港。同時，瑪姬亦增強，引致本地南至東南風開始加強。因此，一號戒備信號在六月七日晚上10時30分再度懸掛。由於本港普遍吹強風而離岸及高地間中亦吹烈風，三號強風信號在六月八日零時45分懸掛。在香港強風持續至中午過後，即使當時瑪姬已在上川島附近登陸了一段時間。所有熱帶氣旋警告信號在該日下午1時45分除下。

瑪姬影響香港期間，最少有五人受傷。香港各處約有四宗水浸、六宗棚架倒塌及五十宗大樹倒下的報告。一艘泊於青衣油庫附近的運油躉船在巨浪中沉沒。另一艘運載50 000公升輕質柴油的躉船在屯門碼頭附近沉沒，導致附近蝴蝶灣受到污染而封閉。瑪姬亦引致一些道路需要封閉，渡輪、巴士及空中服務受到延誤。

表3.2.1-3.2.3分別是瑪姬影響香港時各站所錄得的最高風速、日雨量及最高潮汐資料。圖3.2.1是瑪姬的路徑圖。圖3.2.2是瑪姬橫過香港時，京士柏錄得的風向、風速及氣壓之變化。瑪姬的氣旋性流場顯示在圖3.2.3。圖3.2.4是瑪姬影響香港期間的雨量分佈。瑪姬的衛星雲圖及雷達回波圖則顯示於圖3.2.5-3.2.6。而瑪姬在香港造成的破壞可參見圖3.2.7-3.2.8。

3.2

◆

Typhoon Maggie (9903) 2 - 8 June 1999

Maggie formed as a tropical depression over the western North Pacific about 1 070 km east-southeast of Manila on the early morning of 2 June. It intensified rapidly into a tropical storm that day. Following a northwestward course the next day, Maggie intensified further into a severe tropical storm. It attained typhoon strength on 4 June and headed towards Bashi Channel. In the Philippines, the circulation of Maggie caused three deaths and two injuries. In Taiwan, two persons were killed and five reported missing in the wake of Maggie. Electricity supply to more than 100 000 households was cut off. Losses in agricultural production were estimated at NT\$ 596 million.

Upon entering the South China Sea on 6 June, Maggie turned westwards heading towards the south China coast. It landed over Hong Kong on the early morning of 7 June and weakened into a severe tropical storm. After crossing Hong Kong, Maggie weakened gradually into a tropical storm as it skirted the coast of western Guangdong. It made landfall near Shangchuan Dao during the night after executing an anti-clockwise loop just off the coast. Moving further inland, Maggie weakened into an area of low pressure on 8 June. Maggie caused four deaths in Guangdong. Over 3 200 houses and 120 vessels were destroyed or damaged. Direct economic loss was estimated at about 1 200 million RMB.

In Hong Kong the Standby Signal No. 1 was hoisted at 11.45 p.m. on 5 June when Maggie was about 800 km to the east-southeast. As Maggie moved closer to Hong Kong, local winds strengthened from the north and the Strong Wind Signal No. 3 was hoisted at 2.15 p.m. on 6 June. As Maggie came still closer that night and with gales being expected, the No. 8 NORTHWEST Gale or Storm Signal was hoisted at 0.30 a.m. on 7 June. With Maggie's landfall over Hong Kong imminent and winds strengthening even further, the Increasing Gale or Storm Signal No. 9 was hoisted at 2.45 a.m.

Maggie made landfall over Sai Kung Peninsular in Hong Kong some thirty minutes after the hoisting of the No. 9 signal. It traversed Hong Kong from northeast to southwest at about 30 km/h before moving to offshore waters. Maggie was closest to the Hong Kong Observatory Headquarters at around 4 a.m. when it was about 5 km to the northwest. During its passage, Maggie brought frequent squalls and heavy rain to Hong Kong. Apart from Tai Mo Shan, winds were strongest in Sha Lo Wan where a maximum hourly wind of 79 km/h and a maximum gust of 117 km/h were recorded. Winds near the centre of Maggie experienced a temporary lull as it passed by. Pressure also dropped sharply. The lowest instantaneous mean sea-level pressures recorded at some selected stations were as follows :-

<u>Station</u>	<u>Lowest instantaneous mean sea-level pressure</u>	<u>Time</u>	<u>Date/Month</u>
Hong Kong Observatory Headquarters	980.8 hPa	3.50 a.m.	7/6
Sha Tin	977.1 hPa	3.40 a.m.	7/6
King's Park	980.6 hPa	3.53 a.m.	7/6
Cheung Chau	981.2 hPa	4.29 a.m.	7/6

After Maggie departed Hong Kong, local winds turned to easterly or northeasterly and the No. 9 signal was replaced by the No. 8 NORTHEAST Gale or Storm Signal at 5.45 a.m. on 7 June. As Maggie continued to move away, local winds began to subside and the No. 8 signal was replaced by the Strong Wind Signal No. 3 at 10.30 a.m. All tropical cyclone warning signals were lowered at 2.45 p.m.

Maggie's looping motion off Shangchuan Dao brought it briefly closer to Hong Kong again. Maggie intensified at the same time and local winds began to strengthen from the south to southeast. As a result, the Standby Signal No. 1 was hoisted again at 10.30 p.m. on 7 June. With winds becoming strong and occasionally reaching gale force offshore and on high ground, the Strong Wind Signal No. 3 was hoisted at 0.45 a.m. on 8 June. Strong winds over Hong Kong persisted till after midday, despite Maggie having already made landfall near Shangchuan Dao for some time. All tropical cyclone warning signals were lowered at 1.45 p.m.

During the passage of Maggie, at least five persons were injured. Some four cases of flooding, six of collapsed scaffoldings and fifty of toppled trees were reported in Hong Kong. One oil barge docked near Tsing Yi oil storage sank in high seas. Another oil barge carrying 50 000 litres of light diesel sank near Tuen Mun pier, its cargo polluting the nearby Butterfly Beach which was forced to close. Maggie also caused some road closures and disruptions to ferry, bus and air services.

Information on maximum winds, daily rainfall and maximum tides recorded during the passage of Maggie is given in Tables 3.2.1 - 3.2.3. Figure 3.2.1 shows the track of Maggie. The time series of wind direction, wind speed and pressure at King's Park showing the passage of the centre of Maggie are given in Figure 3.2.2, and the cyclonic characteristics of Maggie's wind field in Figure 3.2.3. The rainfall distribution associated with Maggie is shown in Figure 3.2.4. Satellite and radar imageries of Maggie are given in Figures 3.2.5 - 3.2.6. And Figures 3.2.7-3.2.8 show some of the damage caused by Maggie in Hong Kong.

表 3.2.1 在瑪姬影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.2.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signals for Maggie

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust			日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind			日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)	風向 Direction			風速(公里/小時) Speed (km/h)				
中環	Central	東	E	83	8/6	0239	東南偏東	ESE	40	8/6	0200
中環廣場	Central Plaza	西	W	108	7/6	0338	西	W	76	7/6	0400
赤鱗角 (機場)	Chek Lap Kok (Airport)	東北	NE	88	7/6	0450	東北	NE	59	7/6	0500
長洲	Cheung Chau	南	S	115	8/6	0016	南	S	77	8/6	0100
		南	S	115	8/6	0017					
長沙灣	Cheung Sha Wan	東南偏南	SSE	54	8/6	0300	南	S	19	8/6	0600
青洲	Green Island	東南偏南	SSE	137	8/6	0028	南	S	77	8/6	0100
京士柏	King's Park	東南偏南	SSE	68	8/6	0313	東	E	31	7/6	0600
		東南	SE	68	8/6	0323					
流浮山	Lau Fau Shan	西北	NW	110	7/6	0354	西北	NW	72	7/6	0400
平洲	Ping Chau	東北偏東	ENE	104	7/6	0306	東	E	36	7/6	0400
西貢	Sai Kung	東南偏南	SSE	92	8/6	0003	東南偏南	SSE	65	8/6	0100
沙螺灣	Sha Lo Wan	東北偏東	ENE	117	7/6	0501	東	E	79	7/6	0600
沙田	Sha Tin	西	W	68	7/6	0338	西南偏南	SSW	25	8/6	1300
石崗	Shek Kong	東北偏北	NNE	112	7/6	0512	東北偏北	NNE	51	7/6	0500
天星碼頭	Star Ferry	西	W	81	7/6	0344	西北偏西	WNW	56	7/6	0400
打鼓嶺	Ta Kwu Ling	北	N	76	7/6	0353	東北	NE	34	7/6	0500
大尾篤	Tai Mei Tuk	東北偏北	NNE	139	7/6	0327	東北偏北	NNE	67	7/6	0400
大帽山	Tai Mo Shan	西	W	142	7/6	0331	東北偏東	ENE	88	7/6	0500
		西北偏西	WNW	142	7/6	0345					
塔門	Tap Mun	西北	NW	113	7/6	0250	西北偏西	WNW	54	7/6	0200
大老山	Tate's Cairn	西北偏西	WNW	110	7/6	0312	西北偏西	WNW	65	7/6	0300
鯽魚湖	Tsak Yue Wu	西北偏西	WNW	72	7/6	0320	東北偏北	NNE	22	6/6	1100
將軍澳	Tseung Kwan O	南	S	68	8/6	0352	西南偏南	SSW	23	8/6	0600
青衣	Tsing Yi	東南偏南	SSE	104	8/6	0005	東南偏南	SSE	56	8/6	0300
屯門	Tuen Mun	東南偏南	SSE	92	8/6	0139	南	S	41	8/6	0500
橫瀾島	Waglan Island	西	W	92	7/6	0333	東南偏南	SSE	70	8/6	0100
黃竹坑	Wong Chuk Hang	西北偏西	WNW	62	7/6	0138	東	E	27	7/6	0900

表 3.2.2 瑪姬影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位為毫米)
Table 3.2.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Maggie

站 (參閱圖 3.2.4) Station (see Fig. 3.2.4)	六月五日 5 Jun	六月六日 6 Jun	六月七日 7 Jun	六月八日 8 Jun	總雨量 Total
香港天文台 Hong Kong Observatory	0.0	微量 Trace	61.3	19.2	80.5
H13 半山區 Mid-levels	0.0	0.0	73.0	[11.0]	[84.0]
H19 筲箕灣 Shau Kei Wan	0.0	0.0	56.0	[15.5]	[71.5]
H21 淺水灣 Repulse Bay	0.0	0.0	56.0	[13.5]	[69.5]
K04 秀茂坪 Sau Mau Ping	0.0	0.0	84.5	[31.5]	[116.0]
K06 長沙灣 Cheung Sha Wan	0.0	0.0	76.0	[12.0]	[88.0]
N05 粉嶺 Fanling	0.0	0.0	50.5	[24.0]	[74.5]
N06 葵涌 Kwai Chung	0.0	0.0	99.5	[13.0]	[112.5]
N09 沙田 Sha Tin	0.0	0.0	110.0	[29.0]	[139.0]
N12 元朗 Yuen Long	0.0	0.0	67.5	[5.0]	[72.5]
N13 糧船灣 High Island	0.0	2.0	77.5	[33.5]	[113.0]
N17 東涌 Tung Chung	0.0	0.0	40.0	[7.5]	[47.5]
R21 踏石角 Tap Shek Kok	0.0	0.0	58.5	[12.5]	[71.0]
R26 石崗 Shek Kong	0.0	0.0	110.5	[12.5]	[123.0]
R31 大尾篤 Tai Mei Tuk	0.0	0.0	77.0	[30.5]	[107.5]

註： [] 基於不完整的每小時雨量數據。

Note : [] based on incomplete hourly data.

表 3.2.3 瑪姬影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮
Table 3.2.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of Maggie

站 (參閱圖 1.1) Station (see Fig. 1.1)	最高潮位 (海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮 (天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time
樂安排 Lok On Pai	2.28	7/6	2.42 p.m.	0.54	8/6	1.10 a.m.
鯪魚涌 Quarry Bay	2.35	7/6	1.46 p.m.	0.69	7/6	3.46 a.m.
尖鼻咀 Tsim Bei Tsui	2.41	7/6	3.15 p.m.	0.63	7/6	12.15 p.m.
橫瀾島 Waglan Island	2.35	6/6	1.37 p.m.	0.63	7/6	3.32 a.m.

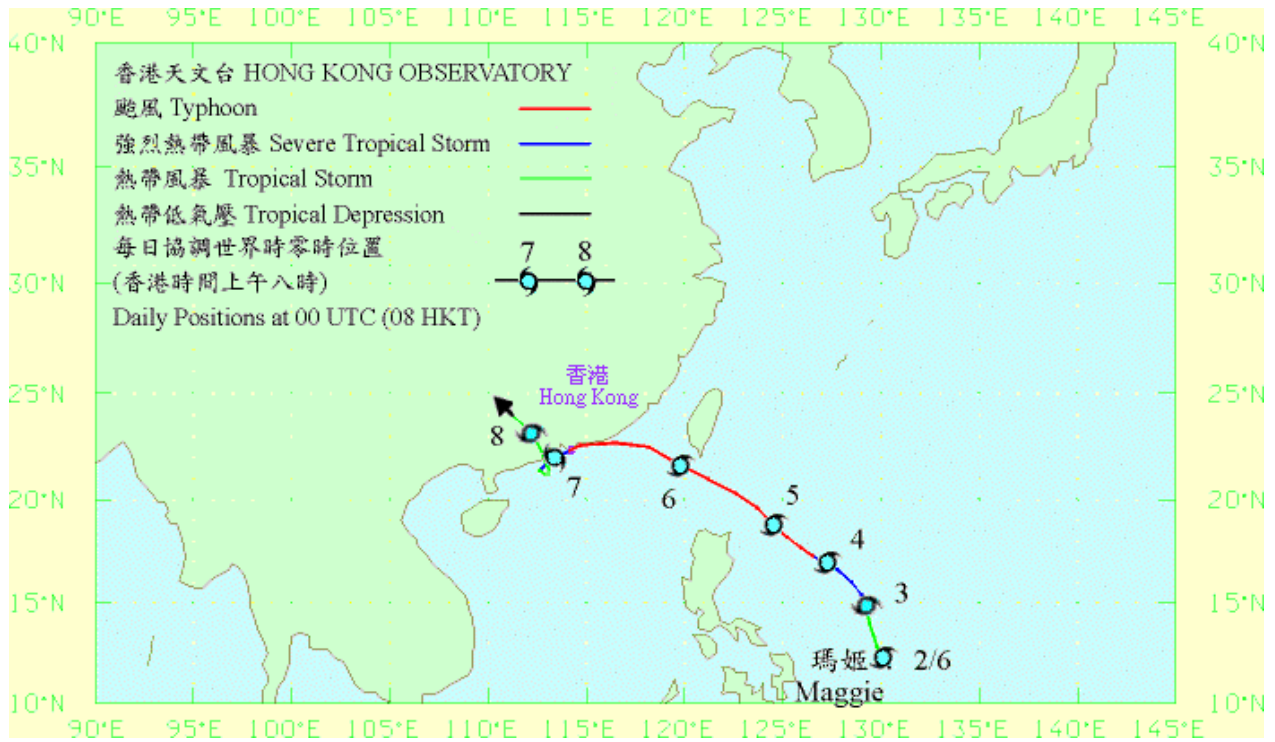


圖 3.2.1.a 一九九九年六月二日至八日颱風瑪姬 (9903) 的路徑圖。
 Figure 3.2.1.a Track of Typhoon Maggie (9903) : 2 – 8 June 1999.

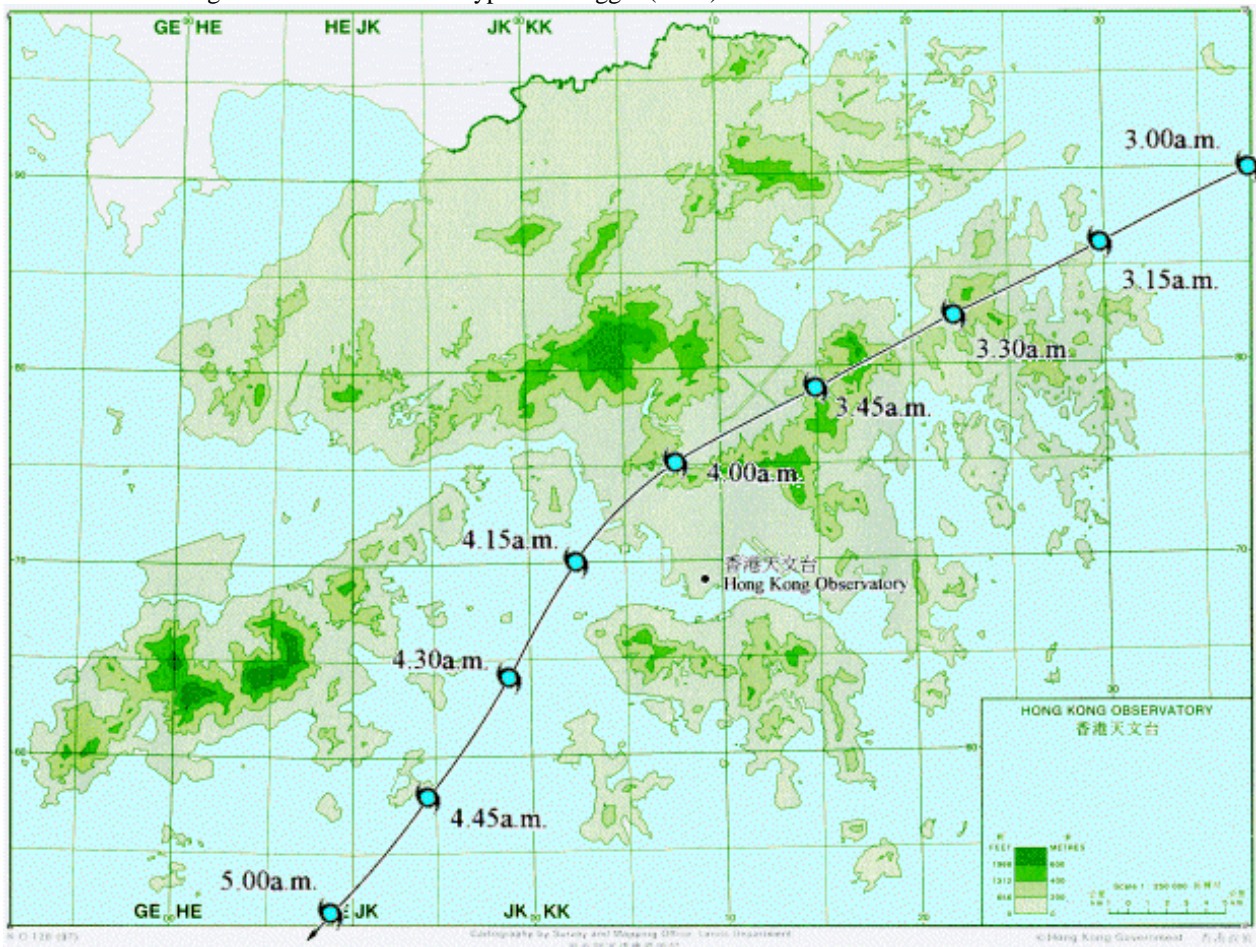


圖 3.2.1.b 一九九九年六月七日瑪姬橫過香港時的路徑圖。
 Figure 3.2.1.b Track of Maggie over Hong Kong on 7 June 1999.

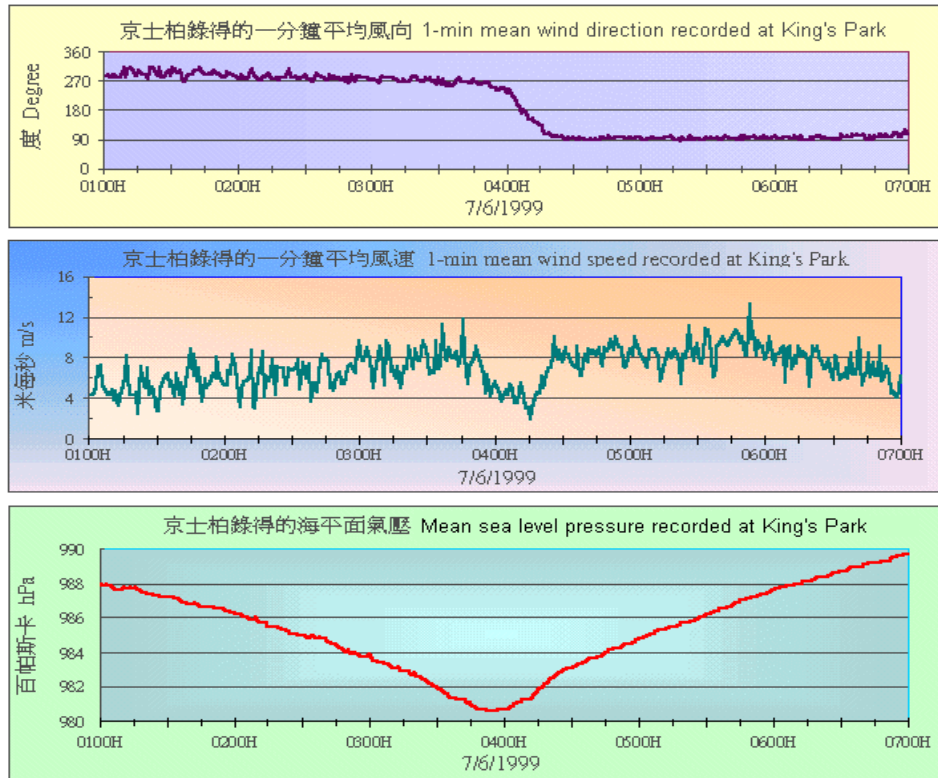


圖 3.2.2 一九九九年六月七日京士柏自動氣象站錄得的風向、風速及氣壓。
 Figure 3.2.2 Traces of wind direction, wind speed and pressure recorded at King's Park automatic weather station on 7 June 1999.



圖 3.2.3 一九九九年六月七日上午4時香港各站錄得的風向和風速。
 Figure 3.2.3 Winds recorded at various stations in Hong Kong at 4 a.m. on 7 June 1999.

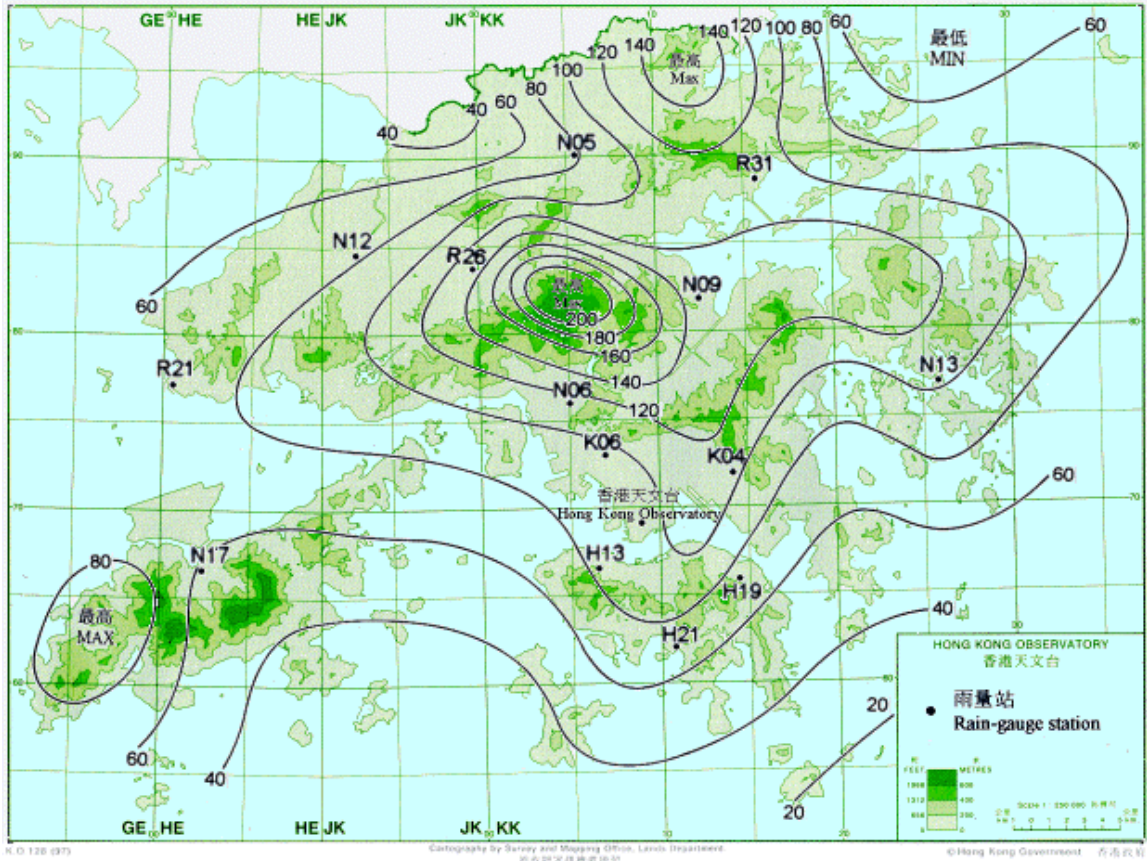


圖 3.2.4 一九九九年六月五日至八日的雨量分佈圖。
Figure 3.2.4 Rainfall distribution on 5 – 8 June 1999.

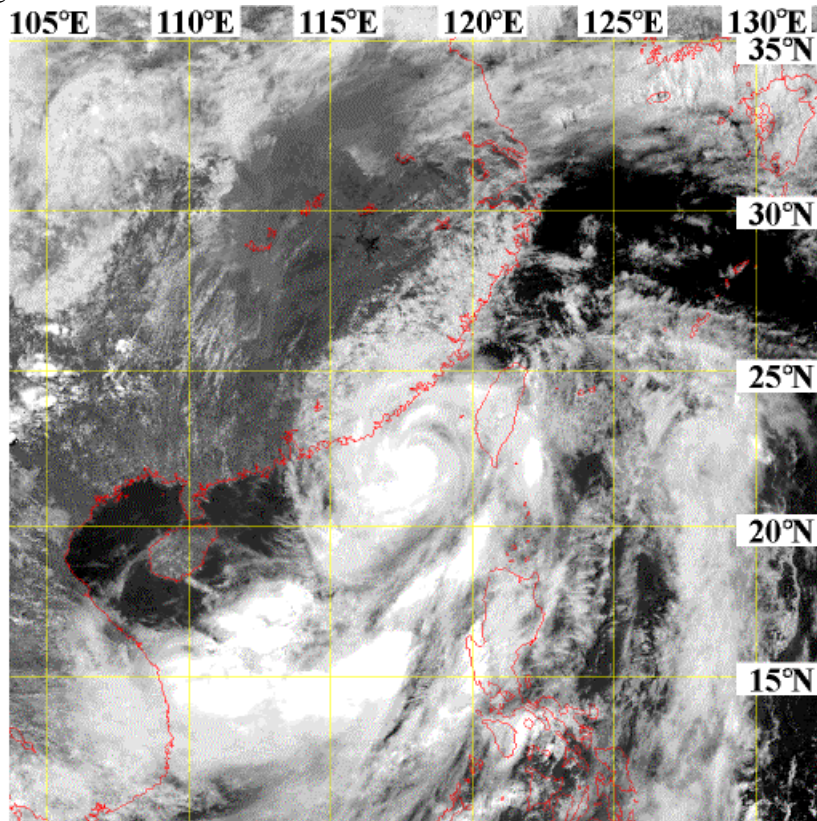


圖 3.2.5.a 一九九九年六月六日約下午2時瑪姬的可見光衛星圖片
(此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
Figure 3.2.5.a Visible imagery of Maggie at around 2 p.m. on 6 June 1999
(originally captured by GMS-5 of JMA).

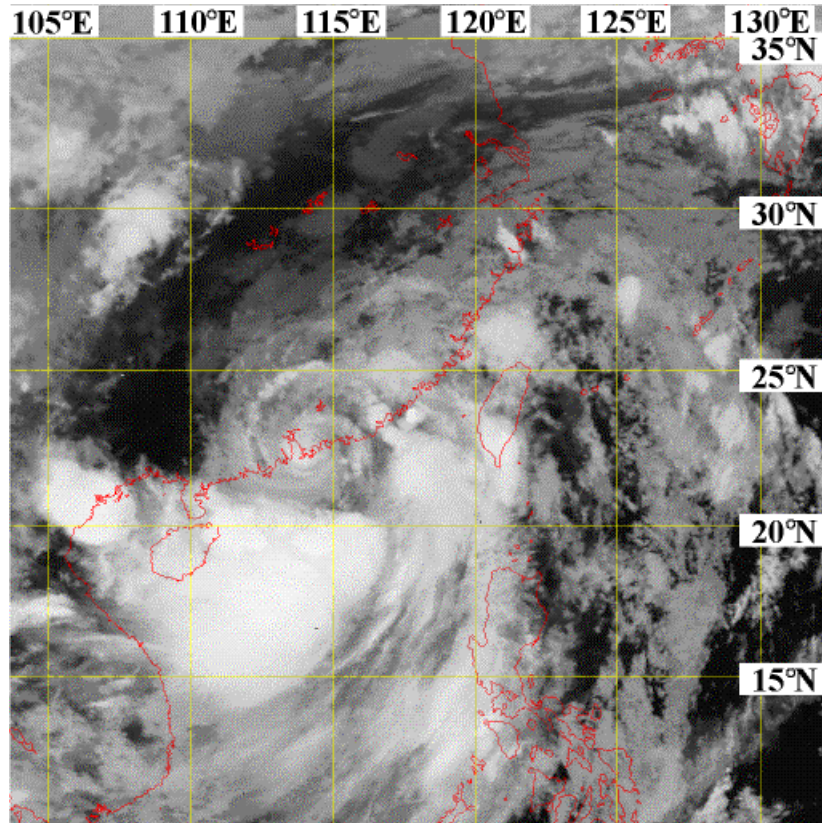


圖 3.2.5.b 一九九九年六月七日約上午4時瑪姬的紅外線衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.2.5.b Infra-red imagery of Maggie at around 4 a.m. on 7 June 1999
 (originally captured by GMS-5 of JMA).

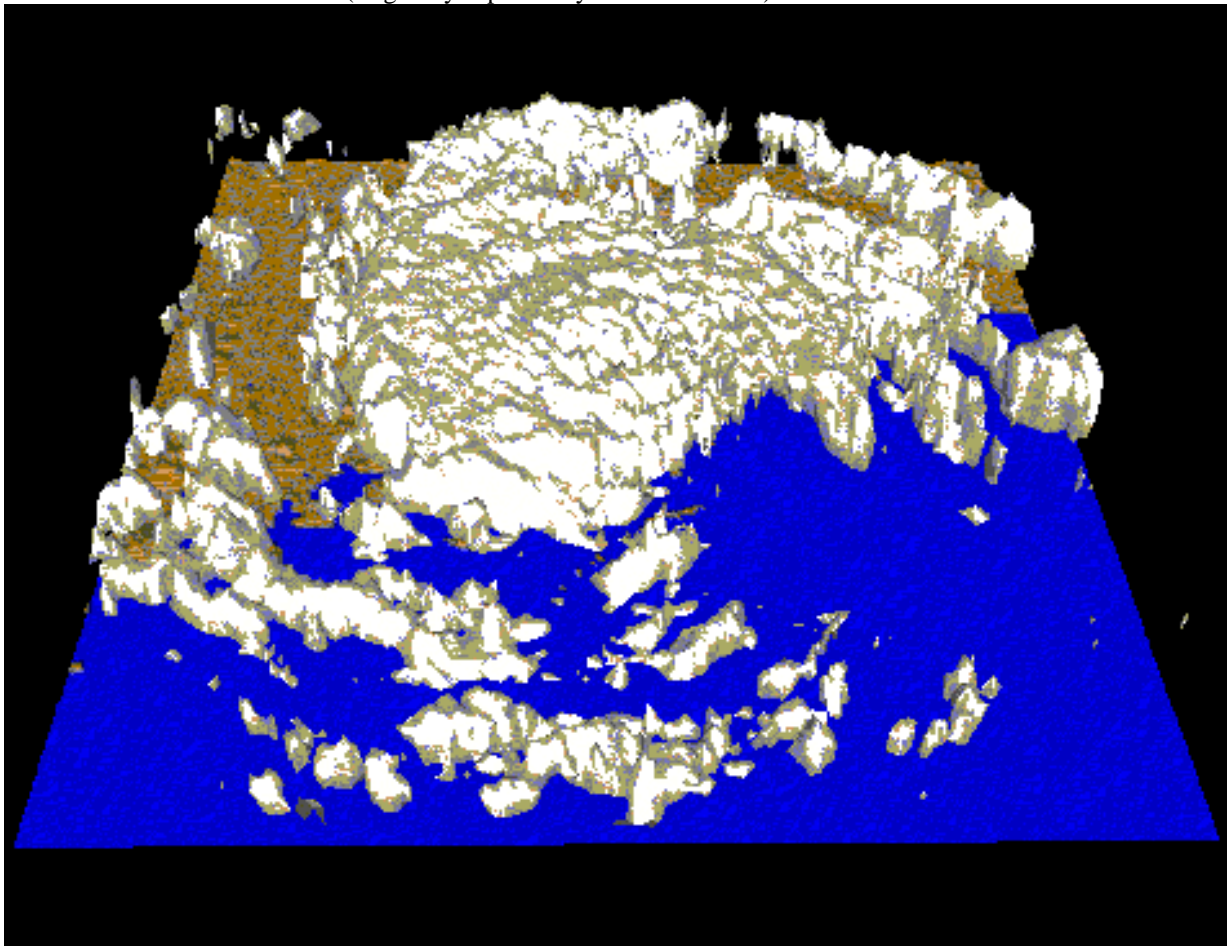


圖 3.2.6 一九九九年六月七日上午4時的立體雷達回波圖片。
 Figure 3.2.6 3-D Radar echoes captured at 4 a.m. on 7 June 1999.

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圖 3.2.7 荃灣一幢工廈的棚架被吹塌（星島日報提供）。
 Figure 3.2.7 Scaffolding collapsed at an industrial building in Tsuen Wan (by courtesy of Sing Tao Daily).

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圖 3.2.8 一艘運油躉船在屯門碼頭附近沉沒，漏出的柴油染污海面（東方日報提供）。
 Figure 3.2.8 An oil barge carrying light diesel sank near Tuen Mun pier, its cargo polluting the sea (by courtesy of Oriental Daily News).

3.3

熱帶風暴(9906) 七月二十五日至二十八日

一低壓區在七月二十五日於香港西南偏南約500公里處發展為一熱帶低氣壓。它初時移動緩慢，但在翌日開始以東北途徑移動並增強為一熱帶風暴。這熱帶風暴在七月二十七日下午減弱為一熱帶低氣壓，並於汕頭附近登陸。隨後它在翌日消散於陸上。

在香港，一號戒備信號在七月二十五日上午11時45分懸掛。當時這熱帶低氣壓位於香港西南偏南約470公里。本地吹清勁東至東北風，離岸及高地間中吹強風。熱帶低氣壓的外圍雨帶亦為本港帶來零散狂風驟雨。在七月二十六日，這熱帶低氣壓在南海北部增強為一熱帶風暴，香港的風力逐漸增強，海有大浪。在下午5時，香港天文台總部錄得最低每小時海平面氣壓為993.2百帕斯卡。由於這熱帶風暴繼續逼近華南沿岸並預料本港風勢將普遍增強，三號強風信號在晚上10時45分懸掛。本地轉吹清勁至強風程度偏北風。在七月二十七日約清晨4時這熱帶風暴最接近本港，當時它於香港東南約120公里。它繼續向東北移動並於汕頭附近登陸。隨著本港風力減弱，所有熱帶氣旋警告信號在下午1時45分除下。

在本港，18名泳客被大浪弄傷。陸上並無嚴重損壞的報告。

表3.3.1-3.3.3分別是熱帶風暴影響香港時各站所錄得的最高風速、日雨量及最高潮汐資料。圖3.3.1-3.3.3分別是熱帶風暴的路徑圖、香港的雨量分佈及衛星雲圖。



3.3

Tropical Storm (9906) 25 - 28 July 1999

An area of low pressure developed into a tropical depression about 500 km south-southwest of Hong Kong on 25 July. It drifted slowly at first but began moving northeastwards and intensifying into a tropical storm the next day. The tropical storm weakened into a tropical depression on the afternoon of 27 July as it made landfall near Shantou. It then dissipated over land the following day.

In Hong Kong the Standby Signal No. 1 was hoisted at 11.45 a.m. on 25 July when the tropical depression was about 470 km to the south-southwest. Local winds became fresh from the east to northeast with occasional strong winds offshore and on high ground. Outer rainbands of the tropical depression brought scattered squally showers to Hong Kong. As the tropical depression intensified into a tropical storm over the northern part of the South China Sea on 26 July, local winds strengthened and sea conditions became rough. The lowest hourly sea-level pressure of 993.2 hPa was recorded at the Hong Kong Observatory Headquarters at 5 p.m. The tropical storm continued to move towards the south China coast and with winds over Hong Kong expected to strengthen generally, the Strong Wind Signal No. 3 was hoisted at 10.45 p.m. Locally, winds turned fresh to strong northerly. The closest approach of this tropical storm was about 120 km to the southeast of Hong Kong at around 4 a.m. on 27 July. It then continued to move towards the northeast making landfall near Shantou. As local winds subsided, all tropical cyclone warning signals were lowered at 1.45 p.m.

Locally, 18 swimmers were injured in rough seas. No significant damage over land was reported.

Information on wind, rainfall and tide during the passage of the Tropical Storm is given in Tables 3.3.1-3.3.3. Figures 3.3.1 - 3.3.3 show respectively the track of the Tropical Storm, rainfall distribution in Hong Kong and satellite imageries.

表 3.3.1 在熱帶風暴影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.3.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signals for the Tropical Storm

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)		
中環	Central	東南偏東 ESE	54	26/7	0558	東 E	30	26/7	1500
						東 E	30	26/7	1700
中環廣場	Central Plaza	東北 NE	85	26/7	2011	東北 NE	52	26/7	1700
		東北 NE	85	26/7	2021				
赤鱘角 (機場)	Chek Lap Kok (Airport)	東北 NE	51	26/7	1940	東北 NE	31	26/7	2000
長洲	Cheung Chau	東南偏東 ESE	76	25/7	2134	東 E	47	25/7	2000
長沙灣	Cheung Sha Wan	東北偏北 NNE	45	27/7	0040	東北偏東 ENE	19	25/7	1300
青洲	Green Island	東北 NE	75	26/7	1952	東北偏東 ENE	51	25/7	2100
京士柏	King's Park	東北偏北 NNE	59	26/7	1214	東 E	23	25/7	2000
		東北偏北 NNE	59	26/7	2159	東北偏北 NNE	23	26/7	2100
流浮山	Lau Fau Shan	東北偏東 ENE	59	26/7	1441	西北偏西 WNW	30	27/7	0900
西貢	Sai Kung	東北偏北 NNE	63	26/7	2001	東北偏東 ENE	38	26/7	1600
		東北偏北 NNE	63	26/7	2146				
沙螺灣	Sha Lo Wan	東 E	75	25/7	2259	東 E	40	25/7	2100
沙田	Sha Tin	東北 NE	51	26/7	1942	東北偏北 NNE	22	26/7	2000
石崗	Shek Kong	東北 NE	58	26/7	1813	東北 NE	31	26/7	1800
天星碼頭	Star Ferry	東 E	52	26/7	1128	東 E	27	25/7	2000
打鼓嶺	Ta Kwu Ling	東北偏北 NNE	45	26/7	2138	東北 NE	19	25/7	2200
大尾篤	Tai Mei Tuk	東北 NE	77	26/7	1710	東北 NE	51	26/7	1800
大帽山	Tai Mo Shan	東北 NE	88	25/7	2335	東北 NE	63	26/7	1800
						東北 NE	63	26/7	1900
塔門	Tap Mun	東北偏東 ENE	59	26/7	1557	東 E	31	25/7	2000
						東 E	31	26/7	1700
大老山	Tate's Cairn	東北 NE	92	26/7	1949	東北 NE	63	26/7	2100
鯉魚湖	Tsak Yue Wu	東北偏北 NNE	54	26/7	1859	東北 NE	19	26/7	1800
將軍澳	Tseung Kwan O	東北 NE	59	26/7	1559	東北偏北 NNE	23	26/7	2100
青衣	Tsing Yi	東北 NE	77	26/7	1732	東北 NE	34	26/7	2000
屯門	Tuen Mun	東北偏北 NNE	54	26/7	1939	東北偏北 NNE	20	26/7	2000
橫瀾島	Waglan Island	東北 NE	92	26/7	1653	東北 NE	72	26/7	1700
黃竹坑	Wong Chuk Hang	東 E	68	26/7	2207	東 E	27	26/7	1700

表 3.3.2 熱帶風暴影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位為毫米)

Table 3.3.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of the Tropical Storm

站 (參閱圖 3.3.2) Station (see Fig. 3.3.2)	七月二十五日 25 Jul	七月二十六日 26 Jul	七月二十七日 27 Jul	總雨量 Total
香港天文台 Hong Kong Observatory	0.8	25.8	4.4	31.0
H13 半山區 Mid-levels	2.5	37.0	[8.5]	[48.0]
H19 筲箕灣 Shau Kei Wan	0.0	52.5	[10.0]	[62.5]
H21 淺水灣 Repulse Bay	0.0	27.0	[6.5]	[33.5]
K04 秀茂坪 Sau Mau Ping	2.0	19.5	[11.5]	[33.0]
K06 長沙灣 Cheung Sha Wan	8.5	9.0	[9.5]	[27.0]
N05 粉嶺 Fanling	1.0	7.0	[1.0]	[9.0]
N06 葵涌 Kwai Chung	3.5	8.0	[9.5]	[21.0]
N09 沙田 Sha Tin	4.5	8.0	[13.5]	[26.0]
N12 元朗 Yuen Long	5.5	1.0	[1.5]	[8.0]
N13 糧船灣 High Island	0.0	12.0	[9.5]	[21.5]
N17 東涌 Tung Chung	0.5	4.5	[2.5]	[7.5]
R21 踏石角 Tap Shek Kok	0.0	1.0	[0.5]	[1.5]
R26 石崗 Shek Kong	7.5	3.5	[4.0]	[15.0]
R31 大尾篤 Tai Mei Tuk	4.5	11.5	[2.0]	[18.0]

註： [] 基於不完整的每小時雨量數據。

Note : [] based on incomplete hourly data.

表 3.3.3 熱帶風暴影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

Table 3.3.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of the Tropical Storm

站 (參閱圖 1.1) Station (see Fig. 1.1)	最高潮位 (海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮 (天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time
鰂魚涌 Quarry Bay	2.51	27/7	7.20 a.m.	0.46	26/7	10.48 p.m.
大埔滘 Tai Po Kau	2.40	27/7	6.06 a.m.	0.50	26/7	9.50 p.m.

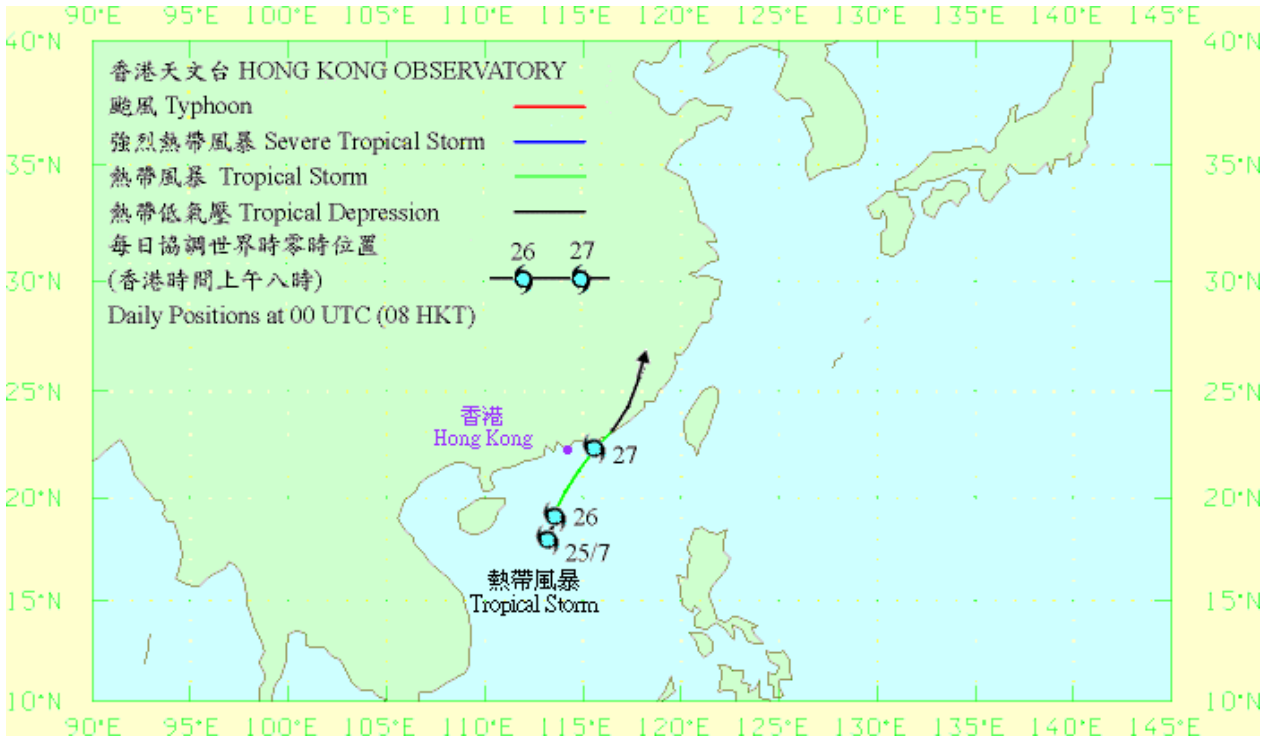


圖 3.3.1 一九九九年七月二十五日至二十八日熱帶風暴 (9906) 的路徑圖。

Figure 3.3.1 Track of the Tropical Storm (9906) : 25 – 28 July 1999.

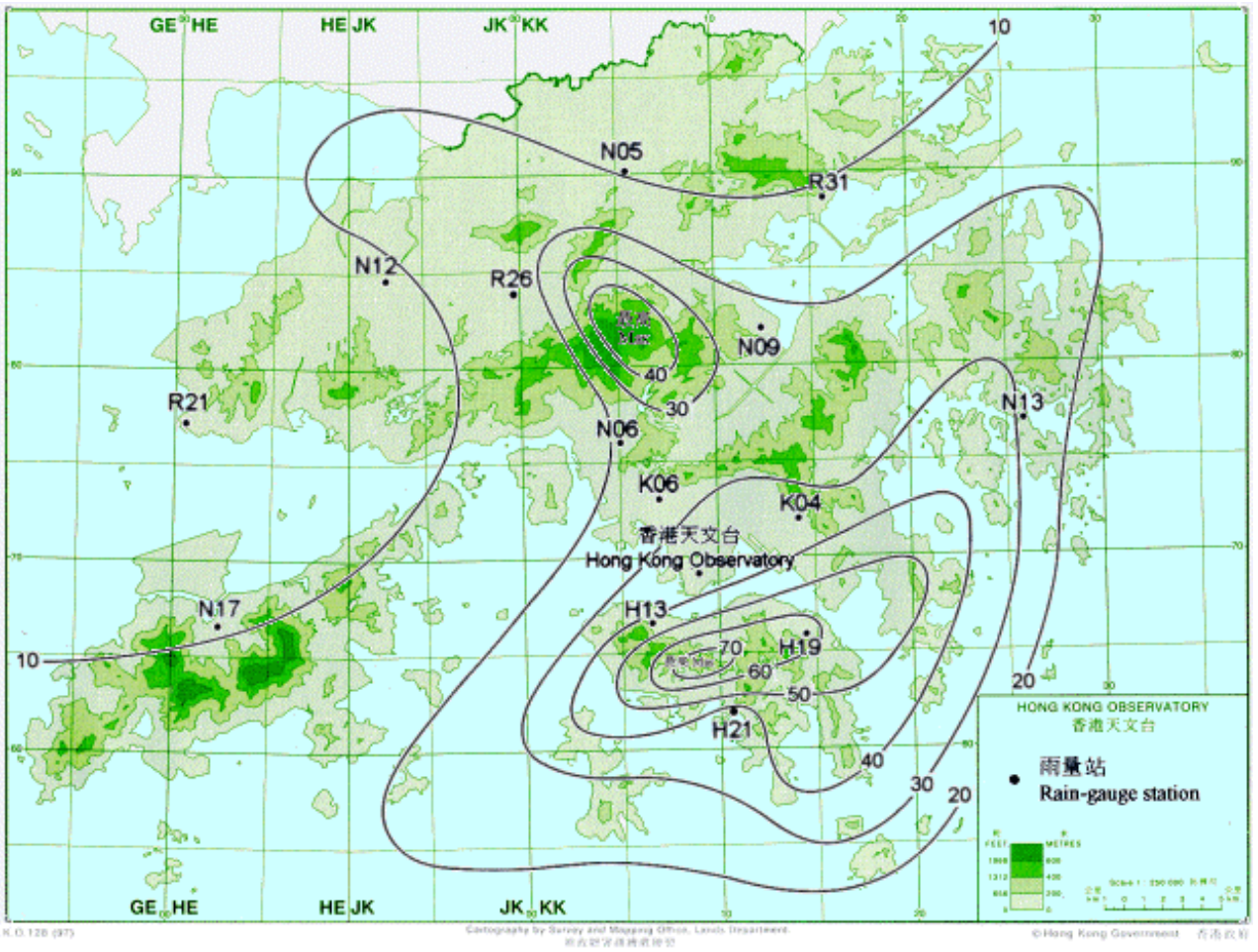


圖 3.3.2 一九九九年七月二十五日至二十七日的雨量分佈圖。

Figure 3.3.2 Rainfall distribution on 25 – 27 July 1999.

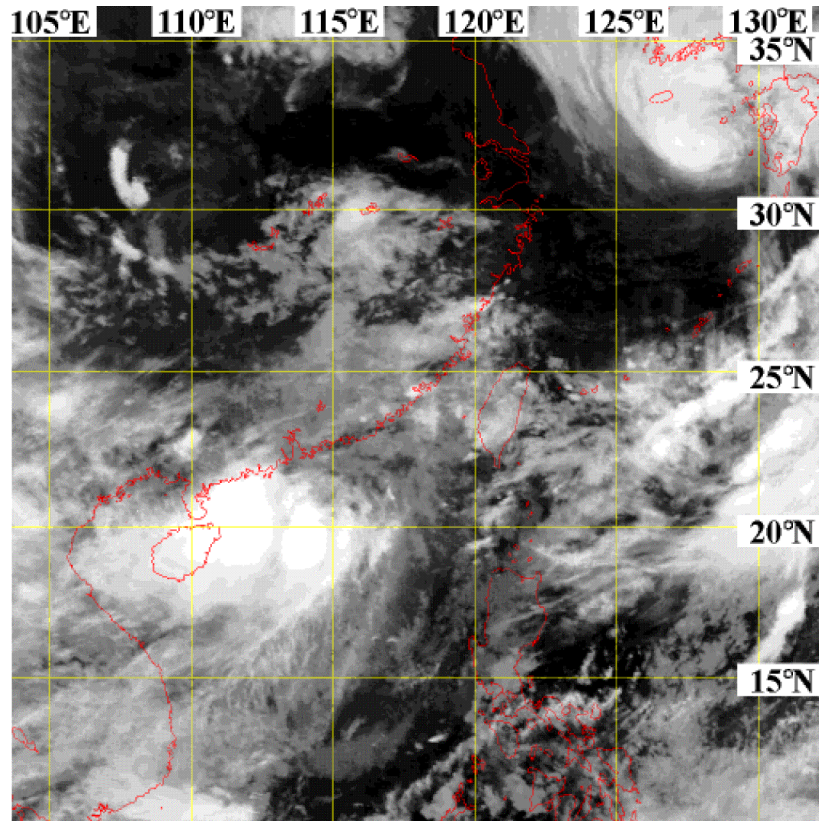


圖 3.3.3.a 一九九九年七月二十七日約上午2時熱帶風暴的紅外線衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.3.3.a Infra-red imagery of the Tropical Storm at around 2 a.m. on 27 July 1999
 (originally captured by GMS-5 of JMA).

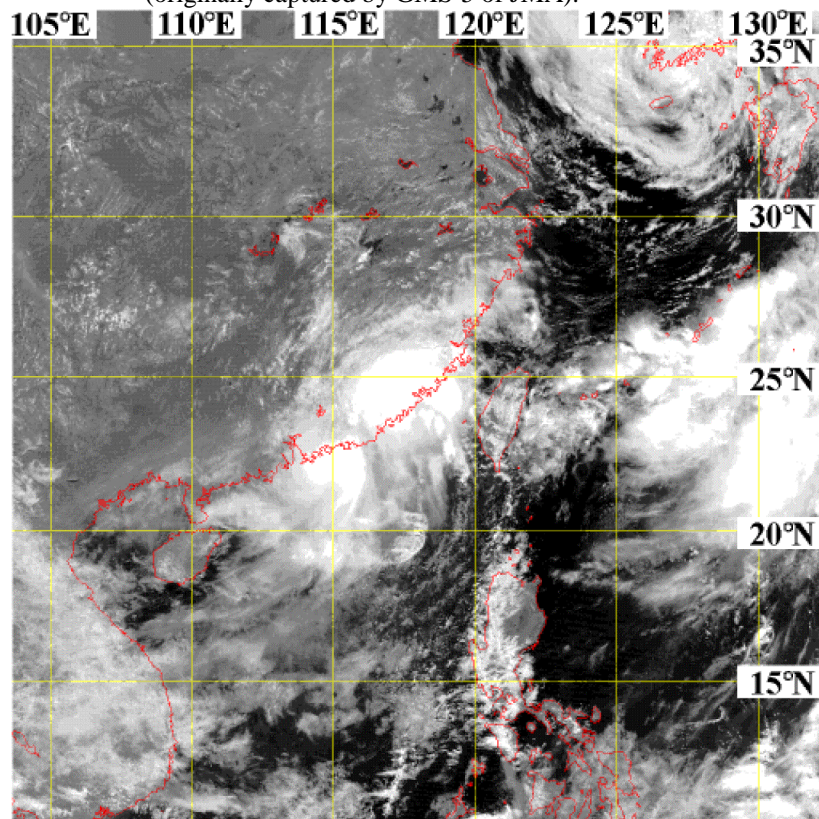


圖 3.3.3.b 一九九九年七月二十七日約上午11時熱帶風暴的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.3.3.b Visible imagery of the Tropical Storm at around 11 a.m. on 27 July 1999
 (originally captured by GMS-5 of JMA).

3.4

颱風森姆(9910) 八月十九日至二十三日

一熱帶低氣壓在八月十九日於馬尼拉東北偏東約680公里處形成，定名為森姆。森姆在太平洋上採取西北偏西路徑移動，並於當晚增強為一熱帶風暴。翌日，它於呂宋北部掠過。在森姆的影響下，菲律賓有一人死亡及九人受傷，超過4 000多人被迫要疏散。

森姆進入南海後，在八月二十一日加強為一強烈熱帶風暴。它以西北方向移動趨向廣東沿岸並在八月二十二日上午稍後時間達至颱風強度。隨後，森姆迅速減弱為一強烈熱帶風暴，並於黃昏時分登陸香港，直趨珠江口。

森姆橫過珠江口後，在八月二十三日於廣東內陸逐漸減弱為一低壓區。在廣東，最少有五人死亡及100人受傷。森姆亦造成嚴重交通堵塞，數所機場被迫要關閉。直接經濟損失約為1.5億元人民幣。

在香港，一號戒備信號在八月二十日下午4時15分懸掛。當時森姆位於香港東南偏東約800公里處。在八月二十一日，本港初時天晴、酷熱及有煙霞。當日下午錄得的最高氣溫達35.1度，這是自一九九零年以來最高的。

森姆的外圍雨帶在八月二十一日下午稍後時間開始為香港帶來驟雨。隨著森姆的逼近，本港離岸海域及高地轉吹強風，三號強風信號在八月二十二日清晨2時30分懸掛。森姆在該日中午前增強成為一颱風，本地風力亦增強，橫瀾島及長洲等地吹烈風。天文台在八月二十二日下午12時30分懸掛八號西北烈風或暴風信號。森姆是本年需要懸掛八號或更高風球的第三個熱帶氣旋。在一月至八月期間懸掛了三次八號或更高風球的情況，今年是自一九七一年以來的第一次。

森姆減弱為一強烈熱帶風暴後，在八月二十二日下午6時左右於西貢東部登陸。森姆約於下午6時15分最接近香港天文台總部，當時它位於天文台東北面約25公里處。登陸後，森姆以每小時約25公里的速度掠過新界東北部，然後進入深圳。在森姆影響香港期間，各站錄得的最低瞬時海平面氣壓如下：-

站	最低瞬時海平面氣壓	時間	日期/月份
香港天文台總部	981.9百帕斯卡	下午 3 時 35 分	22/8
打鼓嶺	983.5百帕斯卡	下午 5 時 25 分	22/8
沙田	982.3百帕斯卡	下午 3 時 17 分	22/8
橫瀾島	979.0百帕斯卡	下午 2 時 19 分	22/8

受森姆的影響，塔門在八月二十二日錄得最高每小時平均風速為52公里，最高陣風則達每小時115公里。橫瀾島錄得最高每小時平均風速為96公里，最高陣風則達每小時148公里。森姆橫過深圳後，於晚上進入珠江口，本地開始轉吹西南風，天文台在晚上8時10分改掛八號西南烈風或暴風信號。當森姆逐漸遠離本港及減弱為一熱帶風暴後，天文台在八月二十三日清晨3時50分改掛三號強風信號。森姆在當晚繼續減弱為一低壓區，所有熱帶氣旋警告信號亦在晚上9時正除下。

森姆離開本港後，與其相聯繫的西南強風為香港帶來暴雨。當時，陣風亦間中達至烈風程度。黑色暴雨警告信號在八月二十三日上午6時13分發出，至中午才被黃色暴雨警告信號取替。黑色暴雨警告信號在八月二十四日再次發出，有效時間由上午 4 時 35 分至上午 10 時

正。森姆為香港帶來的雨量(即熱帶氣旋在出現於香港600公里範圍內至其消散或離開香港600公里範圍之後72小時期間，天文台錄得的雨量)為616.5毫米，打破了一九二六年由另一熱帶氣旋所創的597.0毫米的紀錄，成為自一八八四年有記錄以來為香港帶來最多雨量的熱帶氣旋。

在森姆的影響下，一民航機在八月二十二日黃昏時分於赤鱗角的機場著陸時發生意外，造成三名乘客死亡及超過200多人受傷。在隨後數日，共有360多班航機延誤或被取消。往長洲、坪洲及梅窩的渡輪服務在八月二十二日下午停航，300多名居於這些離島的乘客受到影響。

在本港，強風及烈風吹倒了多棵大樹及招牌。惡劣天氣亦釀成八宗交通意外。海面非常大浪，四名滑浪人士在大尾篤附近失蹤後被尋獲。超過100多人在各種風暴有關的意外中受輕傷。

暴雨為香港各區帶來約310宗水浸及160宗山泥傾瀉的報告。新界北部出現嚴重水浸，積水一度深達兩米。部份村民攀上屋頂或樹頂待援。200多名居於天平山村、米埔、打鼓嶺、丙崗、深井新村的村民被迫要遷離。

深井新村在八月二十三日遭山洪暴發，一名男子被活埋及28人受傷。在香港仔田灣，約30間商舖被泥水圍困。山泥傾瀉亦導致港島多條道路需要封閉。在大嶼山，山泥堵塞了東涌道及嶼南道，大嶼山巴士服務在八月二十四日幾陷癱瘓。在九龍，700多名石陝尾邨居民因受危坡威脅而要在八月二十五日至二十六日撤離居所。

表3.4.1-3.4.3分別是森姆影響香港時各站所錄得的最高風速、日雨量及最高潮汐資料。圖3.4.1是森姆的路徑圖。圖3.4.2是森姆橫過香港時，打鼓嶺錄得的風向、風速及氣壓之變化。森姆的氣旋性流場顯示在圖3.4.3。圖3.4.4是森姆影響香港期間的雨量分佈。森姆的衛星雲圖及雷達回波圖則顯示於圖3.4.5-3.4.6。而森姆在香港造成的破壞可參見圖3.4.7-3.4.11。



3.4

Typhoon Sam (9910) 19 - 23 August 1999

A tropical depression named Sam developed about 680 km east-northeast of Manila on 19 August. Tracking west-northwestwards over the Pacific, Sam intensified into a tropical storm that night. It then swept across the northern part of Luzon the next day. The passage of Sam caused one death and nine injuries in the Philippines. More than 4 000 people had to be evacuated.

Upon entering the South China Sea, Sam intensified into a severe tropical storm on 21 August. Moving northwestwards towards the coast of Guangdong, Sam attained typhoon strength on the late morning of 22 August. Weakening rapidly into a severe tropical storm, Sam made landfall over Hong Kong that evening and headed towards the Zhujiang Kou (Pearl River Estuary).

After crossing the Zhujiang Kou, Sam weakened gradually into an area of low pressure over inland Guangdong on 23 August. In Guangdong, at least five persons were killed and 100 were injured. Sam also caused serious traffic disruption and closure of several airports in Guangdong. Direct economic losses were put at 150 million RMB.

In Hong Kong the Standby Signal No. 1 was hoisted at 4.15 p.m. on 20 August when Sam was about 800 km to the east-southeast. The weather on 21 August was fine and very hot with haze at first. The maximum temperature of 35.1°C recorded at that afternoon was the highest since 1990.

Showers began to set in from the late afternoon of 21 August as Hong Kong came under the influence of Sam's outer rainbands. With Sam moving closer to Hong Kong and winds becoming strong offshore and on high ground, the Strong Wind Signal No. 3 was hoisted at 2.30 a.m. on 22 August. Sam attained typhoon strength before noon and local winds reached gale force at Waglan Island and Cheung Chau. The No. 8 NORTHWEST Gale or Storm Signal was hoisted at 12.30 p.m. Sam was the third tropical cyclone necessitating the hoisting of No. 8 or higher signals in the year. The last time that No. 8 or higher signals had to be hoisted on three separate occasions between January and August was in 1971.

After weakening into a severe tropical storm, Sam made landfall over the eastern part of Sai Kung at around 6 p.m. on 22 August. Sam was closest to the Hong Kong Observatory Headquarters at around 6.15 p.m. when it was about 25 km to the northeast. Following landfall, Sam traversed the northeastern part of the New Territories at a speed of about 25 km/h and crossed into Shenzhen. During the passage of Sam, the lowest instantaneous mean sea-level pressures recorded at some selected stations were as follows :-

<u>Station</u>	<u>Lowest instantaneous mean sea-level pressure</u>	<u>Time</u>	<u>Date/Month</u>
Hong Kong Observatory Headquarters	981.9 hPa	3.35 p.m.	22/8
Ta Kwu Ling	983.5 hPa	5.25 p.m.	22/8
Sha Tin	982.3 hPa	3.17 p.m.	22/8
Waglan Island	979.0 hPa	2.19 p.m.	22/8

During the passage of Sam, a maximum hourly wind of 52 km/h and a maximum gust of 115 km/h were recorded at Tap Mun on 22 August. At Waglan, a maximum hourly wind of 96 km/h and a maximum gust of 148 km/h were recorded. As Sam moved into Shenzhen and entered the Zhujiang Kou that night, local winds began to turn southwesterly and the No. 8 SOUTHWEST Gale or Storm Signal was hoisted at 8.10 p.m. With Sam moving gradually away and weakening into a tropical storm, the No. 8 Signal was replaced by the Strong Wind Signal No. 3 at 3.50 a.m. on 23 August. Sam weakened further into an area of low pressure that night and all tropical cyclone warning signals were lowered at 9.00 p.m.

The southwesterly winds trailing in the wake of Sam brought heavy rain to Hong Kong. Gusts occasionally reached gale force at that time. The Black Rainstorm Warning Signal was issued at 6.13 a.m. on 23 August and was replaced by the Amber Rainstorm Warning Signal at noon. The Black Rainstorm Warning Signal was raised again on 24 August and in force between 4.35 a.m. and 10.00 a.m. The tropical cyclone rainfall (defined as the total rainfall recorded at the Hong Kong Observatory from the time when a tropical cyclone was centred within 600 km of Hong Kong to 72 hours after the tropical cyclone has dissipated or moved outside 600 km of Hong Kong) brought by Sam amounted to 616.5 mm. This exceeded the previous record of 597.0 mm caused by a tropical cyclone in 1926 and made Sam the wettest tropical cyclone ever to affect Hong Kong since records began in 1884.

During the passage of Sam, an accident occurred while an aircraft was trying to land at the airport at Chek Lap Kok in the evening on 22 August. Three passengers were killed and more than 200 injured in the incident. Over 360 other flights were delayed or cancelled in the next few days. Ferry services to Cheung Chau, Peng Chau and Mui Wo were suspended in the afternoon on 22 August and some 300 passengers living in these outlying islands were affected.

Locally, numerous trees toppled and signboards collapsed in gales and strong winds. Eight cases of traffic accidents resulting from the inclement weather were reported. Seas were very rough, four surfers were reported missing near Tai Mei Tuk but were found later. More than 100 people suffered minor injuries in various storm related accidents.

The heavy rain resulted in about 310 cases of flooding and 160 cases of landslides in various part of Hong Kong. The most severe flooding occurred in the northern New Territories where floodwaters two metres in depth were reported. Some villagers were trapped on rooftops and in trees and had to be rescued. More than 200 residents of Tin Ping Shan, Mai Po, Ta Kwu Ling, Ping Kong, Sham Tseng San Tsuen were forced to flee their homes.

In Sham Tseng San Tsuen, one man was buried alive and 28 others were injured in a landslide on 23 August. In Tin Wan in Aberdeen, 30 stores were swamped by mudflow. Many roads on Hong Kong Island were also forced to close due to landslides. On Lantau Island, landslides also caused the closure of Tung Chung Road and South Lantau Road. Bus services on Lantau Island were almost paralyzed on 24 August. In Kowloon, Shekipmei Estate was threatened by possible landslides and over 700 residents had to be evacuated on 25 and 26 August.

Information on wind, rainfall and tide during the passage of Sam is given in Tables 3.4.1-3.4.3. Figure 3.4.1 shows the track of Sam. The time series of wind direction, wind speed and pressure at Ta Kwu Ling showing the passage of the centre of Sam are given in Figure 3.4.2, and the cyclonic characteristics of Sam's wind field in Figure 3.4.3. The rainfall distribution associated with Sam is shown in Figure 3.4.4. Satellite and radar imageries of Sam are given in Figures 3.4.5 - 3.4.6. And Figures 3.4.7 - 3.4.11 show some of the damage caused by Sam.

表 3.4.1 在森姆影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.4.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signals for Sam

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)		
中環	Central	西北 NW	94	22/8	1210	西北偏北 NNW	47	22/8	1300
		東南偏東 ESE	94	23/8	0602				
赤鱗角 (機場)	Chek Lap Kok (Airport)	西北 NW	92	22/8	1530	西北偏北 NNW	63	22/8	1500
						西北 NW	63	22/8	1600
						西北 NW	63	22/8	1700
						西北偏西 WNW	63	22/8	1800
長洲	Cheung Chau	西北偏北 NNW	153	22/8	1548	南 S	85	23/8	0700
長沙灣	Cheung Sha Wan	北 N	72	22/8	1459	西南偏南 SSW	30	22/8	2200
青洲	Green Island	南 S	146	23/8	0601	西北偏北 NNW	94	22/8	1400
京士柏	King's Park	西北偏北 NNW	101	22/8	1016	北 N	45	22/8	1100
		南 S	101	22/8	2126				
流浮山	Lau Fau Shan	西北 NW	117	22/8	1423	西北 NW	85	22/8	1400
沙螺灣	Sha Lo Wan	西南 SW	133	23/8	0937	西南偏南 SSW	59	22/8	2400
石崗	Shek Kong	西 W	135	22/8	1530	西北偏西 WNW	31	22/8	1600
天星碼頭	Star Ferry	西南 SW	108	22/8	2040	西南偏西 WSW	45	22/8	2100
打鼓嶺	Ta Kwu Ling	北 N	70	22/8	1533	北 N	31	22/8	1600
大尾篤	Tai Mei Tuk	西北偏北 NNW	140	22/8	1204	北 N	51	22/8	1400
塔門	Tap Mun	北 N	115	22/8	1345	東北 NE	52	22/8	1600
大老山	Tate's Cairn	西北偏北 NNW	161	22/8	1337	西北偏北 NNW	104	22/8	1300
鯽魚湖	Tsak Yue Wu	西北偏北 NNW	110	22/8	1303	北 N	38	22/8	1400
將軍澳	Tseung Kwan O	西北偏北 NNW	108	22/8	1157	北 N	45	22/8	1300
青衣	Tsing Yi	南 S	149	22/8	2306	南 S	70	22/8	2400
屯門	Tuen Mun	西北偏北 NNW	113	22/8	1531	西南 SW	34	22/8	2100
橫瀾島	Waglan Island	北 N	148	22/8	1018	西南 SW	96	22/8	2100
黃竹坑	Wong Chuk Hang	西北 NW	99	22/8	1346	西北 NW	31	22/8	1100

表 3.4.2 森姆影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位為毫米)
Table 3.4.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Sam

站 (參閱圖 3.4.4) Station (see Fig. 3.4.4)	八月二十日 20 Aug	八月二十一日 21 Aug	八月二十二日 22 Aug	八月二十三日 23 Aug	八月二十四日 24 Aug	八月二十五日 25 Aug	八月二十六日 26 Aug	總雨量 Total
香港天文台 Hong Kong Observatory	0.0	6.8	157.9	207.4	174.9	69.2	0.3	616.5
H13 半山區 Mid-levels	0.0	11.0	[132.5]	[201.0]	185.5	35.5	0.0	[565.5]
H19 筲箕灣 Shau Kei Wan	0.0	5.5	114.0	[154.0]	166.5	47.0	0.0	[487.0]
H21 淺水灣 Repulse Bay	0.0	5.5	[115.0]	[94.0]	166.0	14.0	0.0	[394.5]
K04 秀茂坪 Sau Mau Ping	0.0	6.5	[140.5]	[195.0]	154.0	140.0	0.0	[636.0]
K06 長沙灣 Cheung Sha Wan	0.0	11.0	[133.5]	[198.5]	[170.5]	161.5	0.0	[675.0]
N06 葵涌 Kwai Chung	0.0	13.0	[136.5]	[246.5]	191.0	204.0	0.0	[791.0]
N09 沙田 Sha Tin	0.0	9.5	[117.5]	[235.5]	152.5	206.5	0.0	[721.5]
N12 元朗 Yuen Long	0.0	[26.0]	44.0	[271.0]	83.0	58.5	0.0	[482.5]
N13 糧船灣 High Island	0.0	25.5	[93.0]	[122.5]	145.0	128.5	0.0	[514.5]
R21 踏石角 Tap Shek Kok	[0.0]	[9.0]	98.0	184.0	84.5	52.0	[0.0]	[427.5]
R26 石崗 Shek Kong	[0.0]	[0.5]	125.5	[322.5]	105.0	108.0	[0.0]	[661.5]
R31 大尾篤 Tai Mei Tuk	[0.0]	[9.5]	95.5	153.5	116.5	[72.0]	[0.0]	[447.0]

註： [] 基於不完整的每小時雨量數據。

Note : [] based on incomplete hourly data.

表 3.4.3 森姆影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮
Table 3.4.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of Sam

站 (參閱圖 1.1) Station (see Fig. 1.1)	最高潮位 (海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮 (天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time
鯉魚涌 Quarry Bay	2.50	22/8	5.28 a.m.	0.60	22/8	9.46 a.m.
大埔滘 Tai Po Kau	2.54	22/8	5.40 a.m.	0.90	22/8	6.58 p.m.
尖鼻咀 Tsim Bei Tsui	2.76	23/8	7.26 a.m.	0.79	23/8	0.44 a.m.
橫瀾島 Waglan Island	2.56	22/8	5.20 a.m.	0.70	22/8	10.09 a.m.

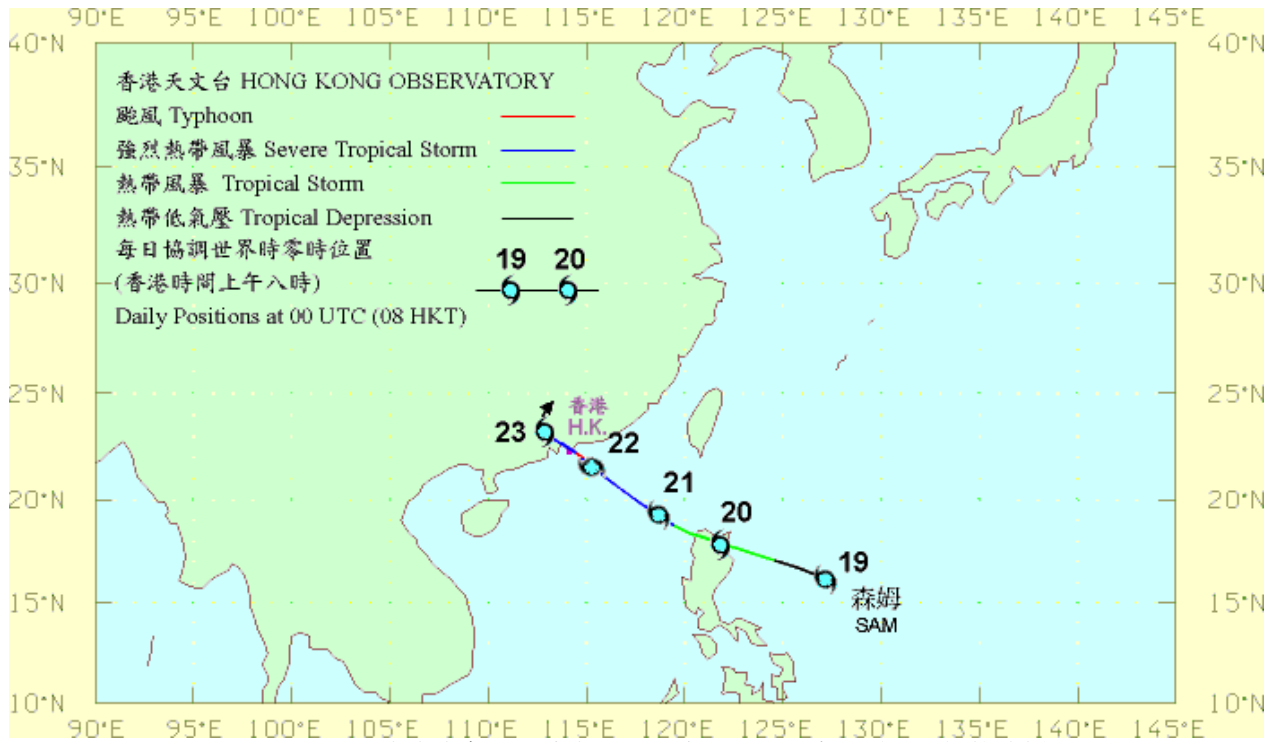


圖 3.4.1.a 一九九九年八月十九日至二十三日颱風森姆 (9910) 的路徑圖。
 Figure 3.4.1.a Track of Typhoon Sam (9910) : 19 – 23 August 1999.

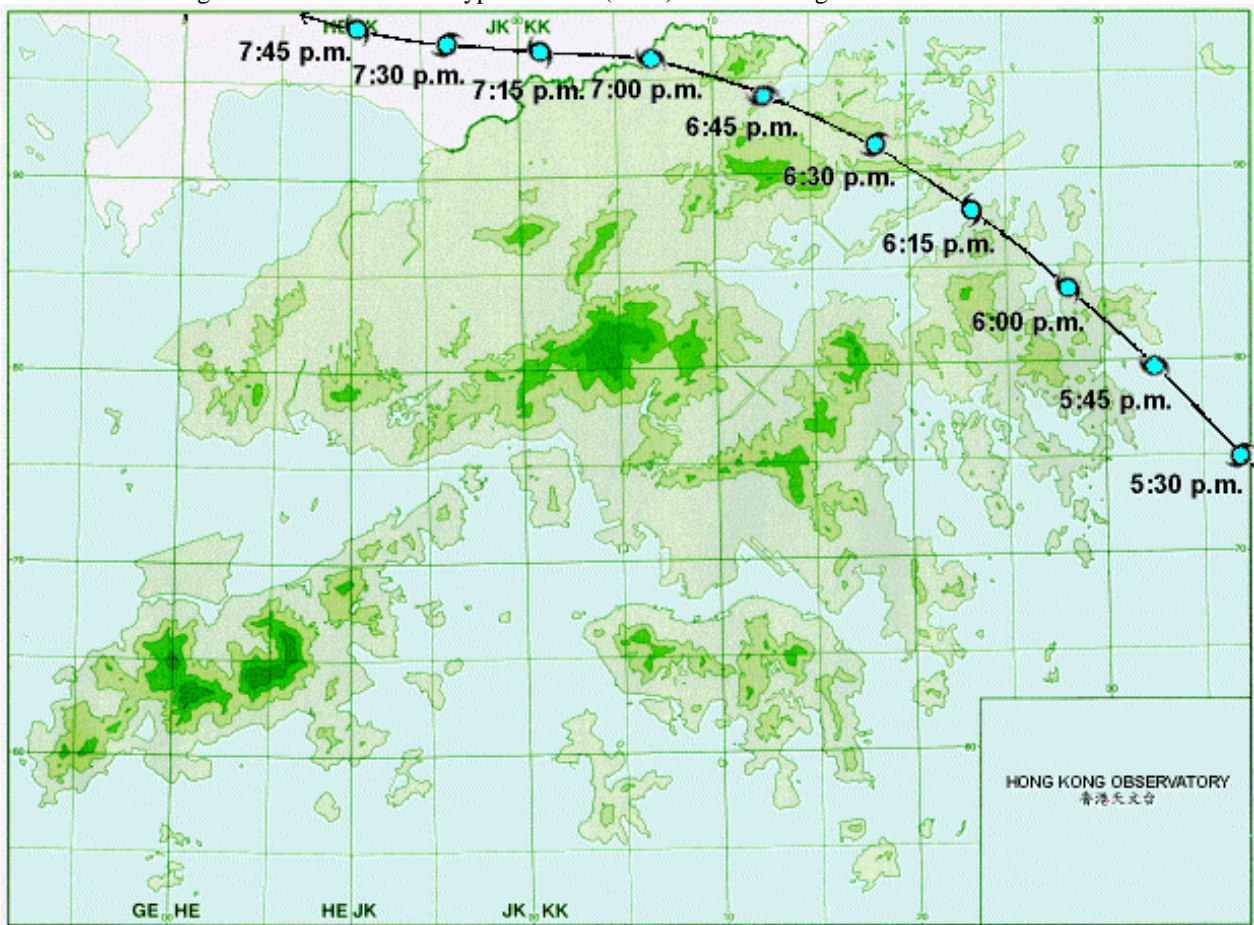


圖 3.4.1.b 一九九九年八月二十二日森姆橫過香港時的路徑圖。
 Figure 3.4.1.b Track of Sam over Hong Kong on 22 August 1999.

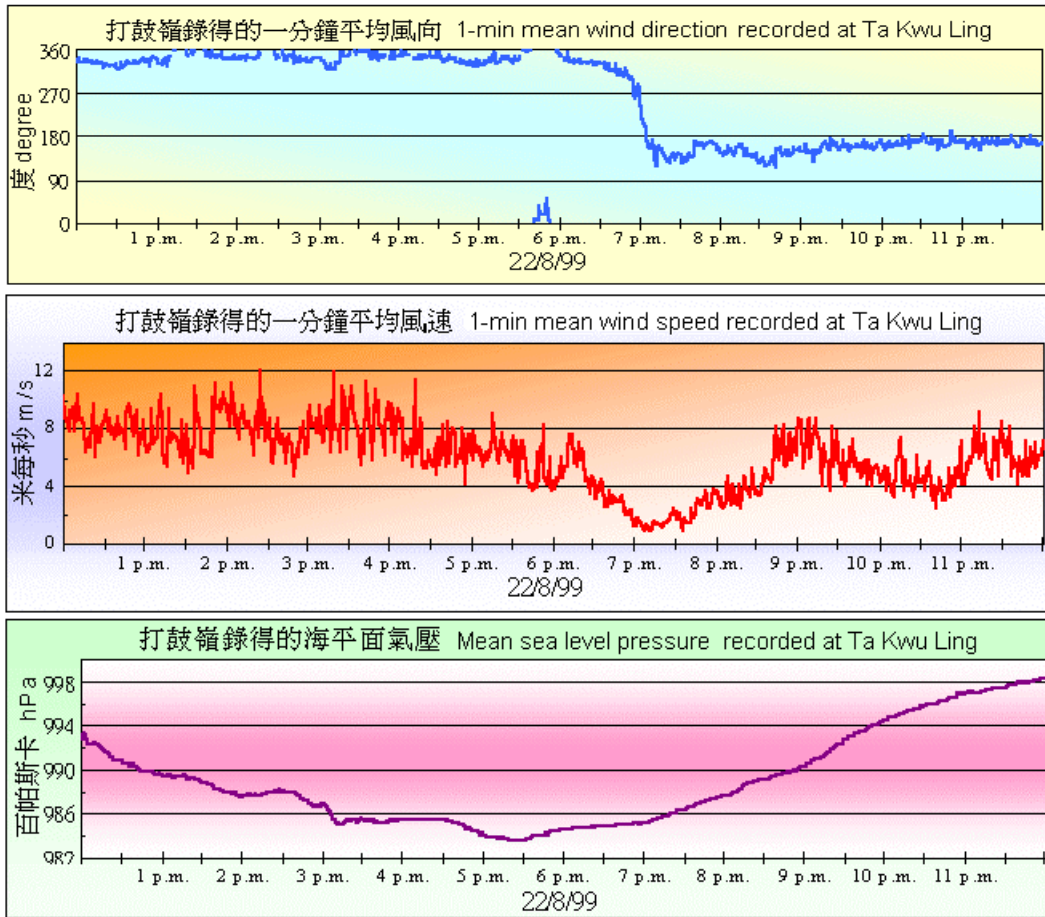


圖 3.4.2 一九九九年八月二十二日打鼓嶺自動氣象站錄得的風向、風速及氣壓。
 Figure 3.4.2 Traces of wind direction, wind speed and pressure recorded at Ta Kwu Ling automatic weather station on 22 August 1999.

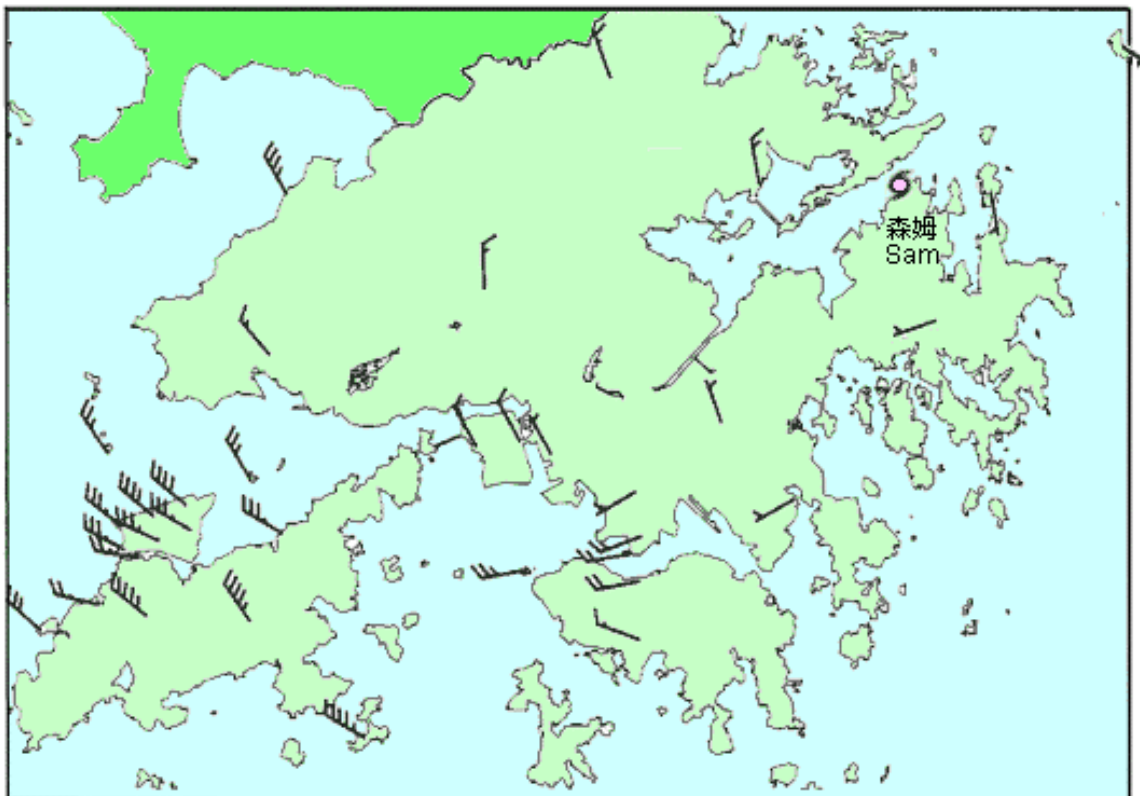


圖 3.4.3 一九九九年八月二十二日下午6時15分香港各站錄得的風向和風速。
 Figure 3.4.3 Winds recorded at various stations in Hong Kong at 6:15 p.m. on 22 August 1999.

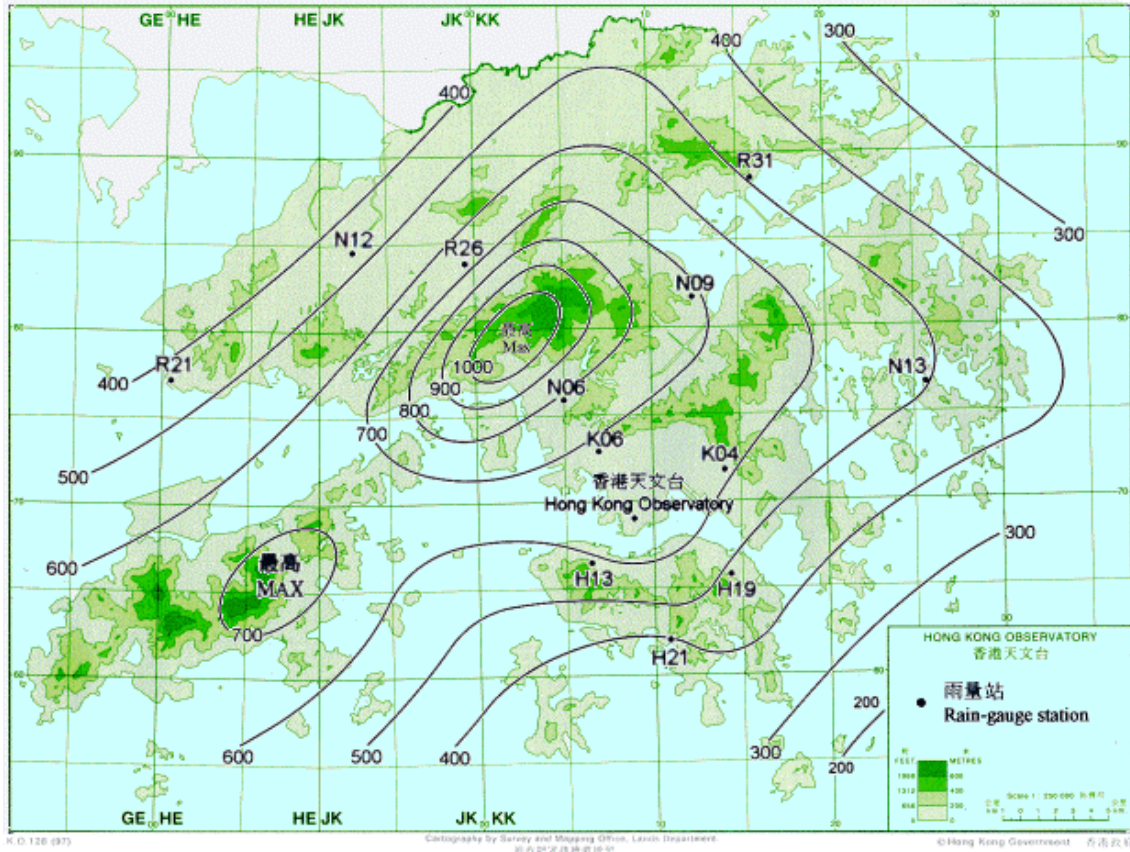


圖 3.4.4 一九九九年八月二十日至二十六日的雨量分佈圖。

Figure 3.4.4 Rainfall distribution on 20 – 26 August 1999.

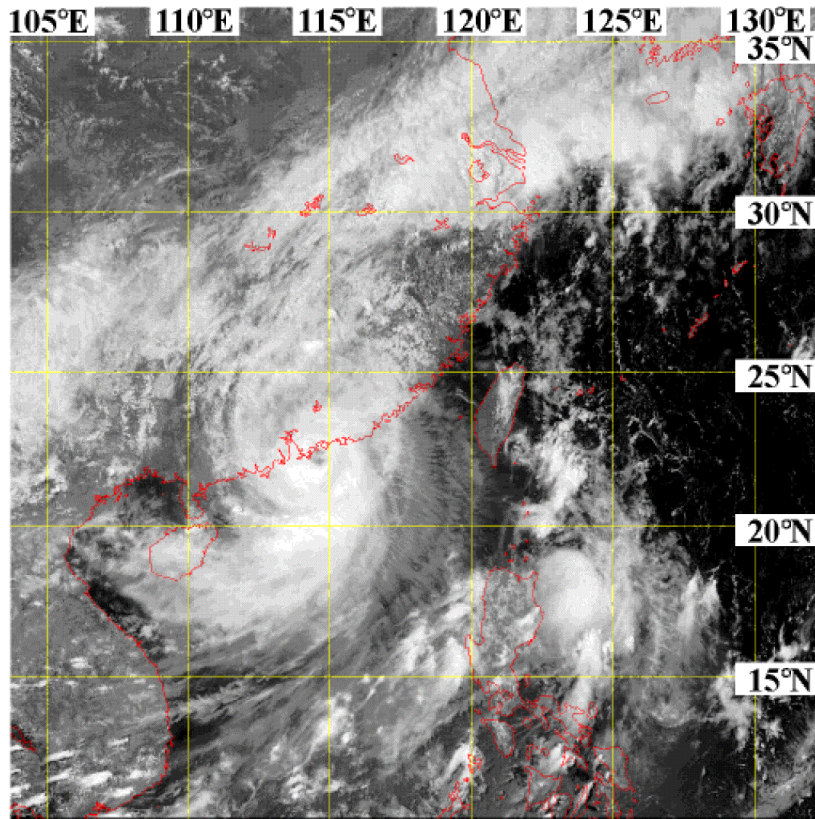


圖 3.4.5.a 一九九九年八月二十二日約下午2時森姆的可見光衛星圖片
(此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.4.5.a Visible imagery of Sam at around 2 p.m. on 22 August 1999
(originally captured by GMS-5 of JMA)

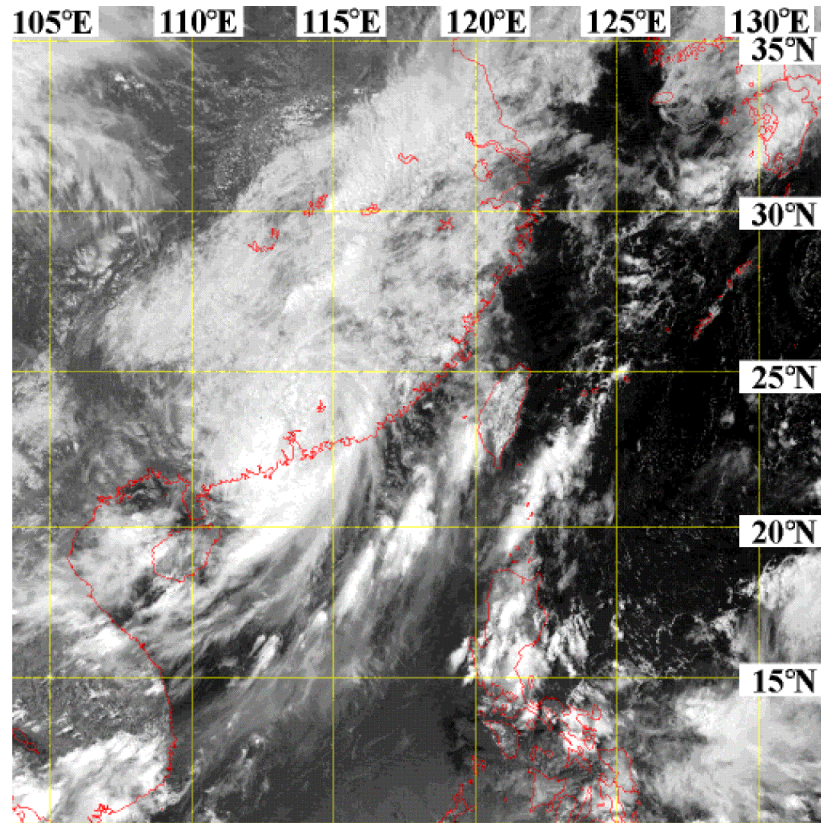


圖 3.4.5.b 一九九九年八月二十三日約下午2時森姆的可見光衛星圖片
(此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.4.5.b Visible imagery of Sam at around 2 p.m. on 23 August 1999
(originally captured by GMS-5 of JMA).

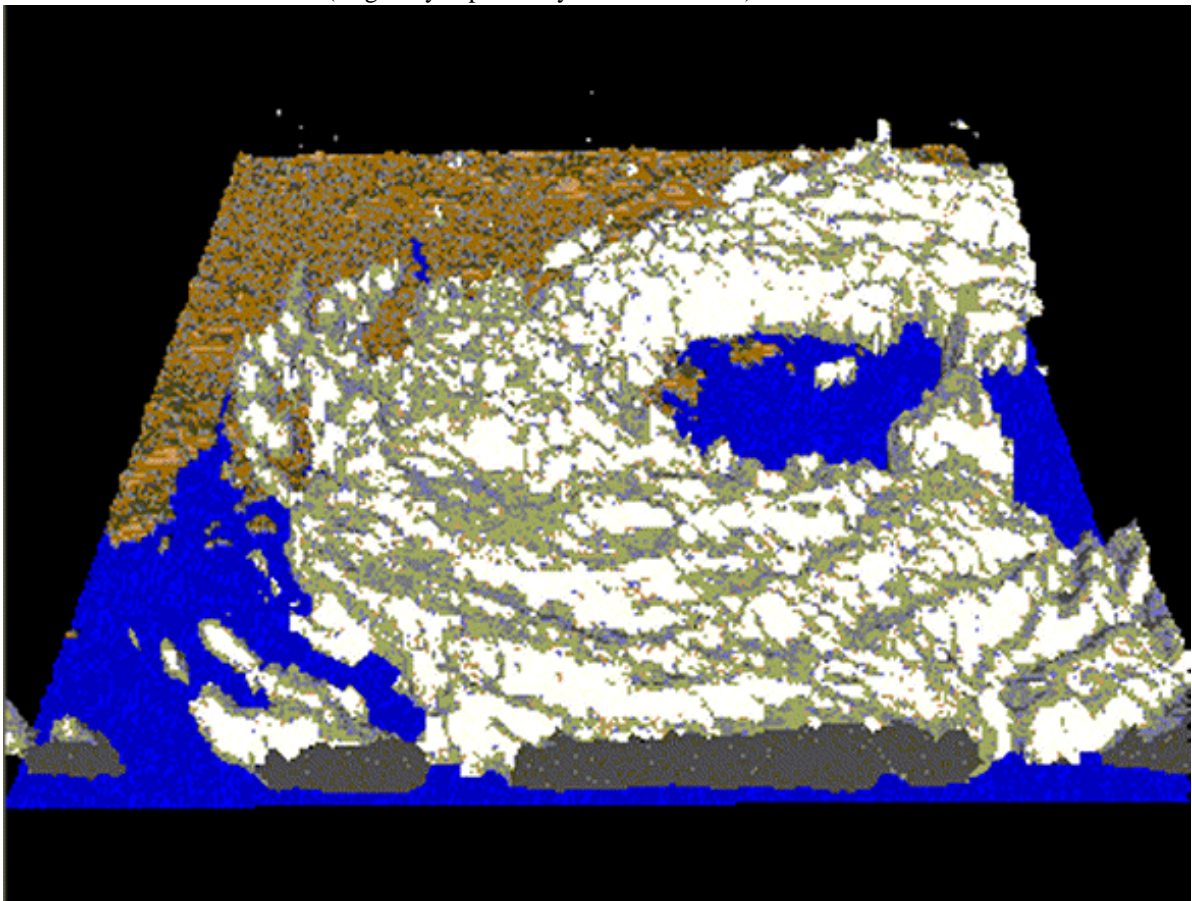


圖 3.4.6 一九九九年八月二十二日下午2時的立體雷達回波圖片。

Figure 3.4.6 3-D Radar echoes captured at 2 p.m. on 22 August 1999.

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圖 3.4.7 香港國際機場發生的意外（星島日報提供）。

Figure 3.4.7 An air accident occurred at the Hong Kong International Airport (by courtesy of Sing Tao Daily).

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圖 3.4.8 天平新村的水浸（文匯報提供）。

Figure 3.4.8 Flooding in Tin Ping San Tsuen (by courtesy of Wen Wei Po).

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圖 3.4.9 小欖一處路面的水浸（東方日報提供）。

Figure 3.4.9 Flooding at a section of road in Siu Lam (by courtesy of Oriental Daily News).

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圖 3.4.10 深井新村發生的山泥傾瀉（星島日報提供）。

Figure 3.4.10 A landslide in Sham Tseng San Tsuen (by courtesy of Sing Tao Daily).

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圖 3.4.11 香港仔田灣街多處受山泥沖毀（蘋果日報提供）。

Figure 3.4.11 Several sections of Tin Wan Street in Aberdeen damaged by mudflow (by courtesy of Apple Daily).

3.5

熱帶風暴芸蒂(9914)
九月一日至四日

芸蒂在九月一日於馬尼拉東南偏東約660公里處發展為一熱帶低氣壓。它以西北偏北路徑移動，掠過呂宋最北部，並於九月二日晚上增強為一熱帶風暴。芸蒂的環流為台灣帶來暴雨，有四所機場被逼要封閉。另外，約70 000多戶電力受到中斷。芸蒂在九月三日進入南海後，採取西北途徑移動直趨廣東沿岸。芸蒂在九月四日早上於汕尾附近登陸，然後減弱為一熱帶低氣壓，並迅速變為一低壓區。翌日該低壓區為溫州帶來暴雨。最少有118人死亡，另100人失蹤及660多人受傷。約500 000人被洪水圍困。直接經濟損失約為20億元人民幣。

在香港，一號戒備信號在九月三日清晨3時45分懸掛。當時芸蒂位於香港東南偏東約710公里處。該日有煙霞，下午及黃昏有幾陣局部地區性雷暴。芸蒂在九月四日上午5時左右最接近本港，當時它位於香港東北偏東約230公里處。香港天文台總部亦在那時候錄得最低每小時海平面氣壓為1 002.8百帕斯卡。在芸蒂影響香港期間，由於受到地形所阻擋，本港不受強風吹襲。當芸蒂在汕尾登陸及減弱為一低壓區後，所有熱帶氣旋警告信號在九月四日上午11時20分除下。

在芸蒂影響香港期間，本港並沒有嚴重破壞的報告。

表3.5.1-3.5.3分別是芸蒂影響香港時各站所錄得的最高風速、日雨量及最高潮汐資料。圖3.5.1-3.5.3分別是芸蒂的路徑圖、香港的雨量分佈及衛星雲圖。

3.5

Tropical Storm Wendy (9914)
1 - 4 September 1999

Wendy developed into a tropical depression about 660 km east-southeast of Manila on 1 September. Tracking north-northwestwards, Wendy skirted the northern tip of Luzon and intensified into a tropical storm on the night of 2 September. Heavy rain associated with the circulation of Wendy caused the closure of four airports in Taiwan. Electricity supply to some 70 000 households were also cut off. Upon entering the South China Sea on 3 September, Wendy adopted a northwestward course and headed towards the coast of Guangdong. After making landfall near Shanwei on the morning of 4 September, Wendy weakened into a tropical depression. It then degenerated rapidly into an area of low pressure. This area of low pressure brought heavy rain in Wenzhou the next day. At least 118 people were killed, another 100 were reported missing and 660 were injured. About 500 000 people were affected by floods. Direct economic losses were put at 2 billion RMB.

In Hong Kong the Standby Signal No. 1 was hoisted at 3.45 a.m. on 3 September when Wendy was about 710 km to the east-southeast. It was hazy that day with a few isolated thunderstorms in the afternoon. Wendy was closest to Hong Kong at around 5 a.m. on 4 September when it was about 230 km to the east-northeast. The lowest hourly sea-level pressure of 1 002.8 hPa was recorded at the Hong Kong Observatory Headquarters at that time. With sheltering by hills, strong winds were not experienced in Hong Kong during the passage of Wendy. As Wendy made landfall near Shanwei and weakened into an area of low pressure, all tropical cyclone warning signals were lowered at 11.20 a.m. on 4 September.

No significant damage was reported in Hong Kong during the passage of Wendy.

Information on wind, rainfall and tide during the passage of Wendy is given in Tables 3.5.1 - 3.5.3. Figures 3.5.1 - 3.5.3 show respectively the track of the Wendy, rainfall distribution in Hong Kong and satellite imageries.

表 3.5.1 在芸蒂影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.5.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signal for Wendy

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)		
中環	Central	西北 NW	25	3/9	2035	西北 NW	13	4/9	0900
		西北偏西 WNW	25	4/9	0503				
赤鱘角 (機場)	Chek Lap Kok (Airport)	西北 NW	47	3/9	1135	西北 NW	20	3/9	1200
長洲	Cheung Chau	西北 NW	40	3/9	2105	北 N	20	4/9	0800
長沙灣	Cheung Sha Wan	西南 SW	22	3/9	1556	東北 NE	9	3/9	1100
青洲	Green Island	西南偏西 WSW	31	3/9	1551	南 S	19	3/9	1600
		西北偏西 WNW	31	3/9	2037				
京士柏	King's Park	西南偏西 WSW	25	3/9	1557	西 W	12	4/9	0800
		西南偏西 WSW	25	3/9	1558				
流浮山	Lau Fau Shan	西 W	41	3/9	1505	西 W	22	3/9	1500
平洲	Ping Chau	東 E	31	3/9	1643	東 E	9	3/9	1700
西貢	Sai Kung	東北偏北 NNE	40	3/9	0901	東北偏北 NNE	22	3/9	1000
沙螺灣	Sha Lo Wan	東北偏東 ENE	40	3/9	1553	西南 SW	13	4/9	0100
沙田	Sha Tin	西南 SW	25	3/9	1604	西南 SW	14	3/9	1600
石崗	Shek Kong	東北偏北 NNE	22	3/9	1310	東北偏北 NNE	6	3/9	1400
		北 N	22	3/9	1946				
天星碼頭	Star Ferry	西北偏西 WNW	36	3/9	1558	西 W	19	4/9	0800
打鼓嶺	Ta Kwu Ling	西北 NW	30	3/9	1949	西北偏北 NNW	12	3/9	1000
大尾篤	Tai Mei Tuk	東北偏東 ENE	27	3/9	0817	東南偏南 SSE	14	3/9	1300
		西北偏西 WNW	27	4/9	0603				
塔門	Tap Mun	東北偏東 ENE	47	3/9	1657	東南 SE	16	3/9	1800
大老山	Tate's Cairn	西北偏西 WNW	45	4/9	0726	西北 NW	25	4/9	0700
鯽魚湖	Tsak Yue Wu	東北偏北 NNE	31	3/9	1057	東北 NE	16	3/9	1000
青衣	Tsing Yi	西北 NW	34	4/9	0842	西北 NW	16	4/9	0400
屯門	Tuen Mun	東南偏東 ESE	75	3/9	1531	西北偏西 WNW	13	3/9	1600
橫瀾島	Waglan Island	東 E	31	3/9	2121	西北偏西 WNW	20	4/9	0200
黃竹坑	Wong Chuk Hang	西北偏北 NNW	27	4/9	0832	東南偏東 ESE	12	3/9	1100

表 3.5.2 芸蒂影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位為毫米)
Table 3.5.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Wendy

站 (參閱圖 3.5.2) Station (see Fig. 3.5.2)	九月三日 3 Sep	九月四日 4 Sep	九月五日 5 Sep	總雨量 Total
香港天文台 Hong Kong Observatory	0.0	微量 Trace	3.8	3.8
H13 半山區 Mid-levels	[0.0]	0.0	0.5	[0.5]
H19 筲箕灣 Shau Kei Wan	[0.0]	0.0	11.0	[11.0]
H21 淺水灣 Repulse Bay	[0.0]	0.0	19.0	[19.0]
K04 秀茂坪 Sau Mau Ping	[0.0]	0.5	18.0	[18.5]
K06 長沙灣 Cheung Sha Wan	[0.0]	1.0	0.5	[1.5]
N05 粉嶺 Fanling	[4.0]	0.0	1.0	[5.0]
N06 葵涌 Kwai Chung	[1.0]	0.0	1.0	[2.0]
N09 沙田 Sha Tin	[0.0]	0.0	6.0	[6.0]
N12 元朗 Yuen Long	[6.0]	0.0	0.0	[6.0]
N13 糧船灣 High Island	[0.0]	0.0	49.0	[49.0]
N17 東涌 Tung Chung	[1.5]	0.0	0.0	[1.5]
R21 踏石角 Tap Shek Kok	[0.0]	[0.0]	0.0	[0.0]
R26 石崗 Shek Kong	[8.5]	[0.0]	0.5	[9.0]

註： [] 基於不完整的每小時雨量數據。

Note : [] based on incomplete hourly data.

表 3.5.3 芸蒂影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮
Table 3.5.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of Wendy

站 (參閱圖 1.1) Station (see Fig. 1.1)	最高潮位 (海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮 (天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度 (米)	日期/月份	時間	高度 (米)	日期/月份	時間
	Height (m)	Date/Month	Time	Height (m)	Date/Month	Time
鯽魚涌 Quarry Bay	2.35	4/9	3.33 a.m.	0.29	4/9	3.28 a.m.
大埔滘 Tai Po Kau	2.25	4/9	4.40 a.m.	0.19	4/9	4.55 a.m.
橫瀾島 Waglan Island	2.33	4/9	4.12 a.m.	0.18	4/9	4.11 a.m.

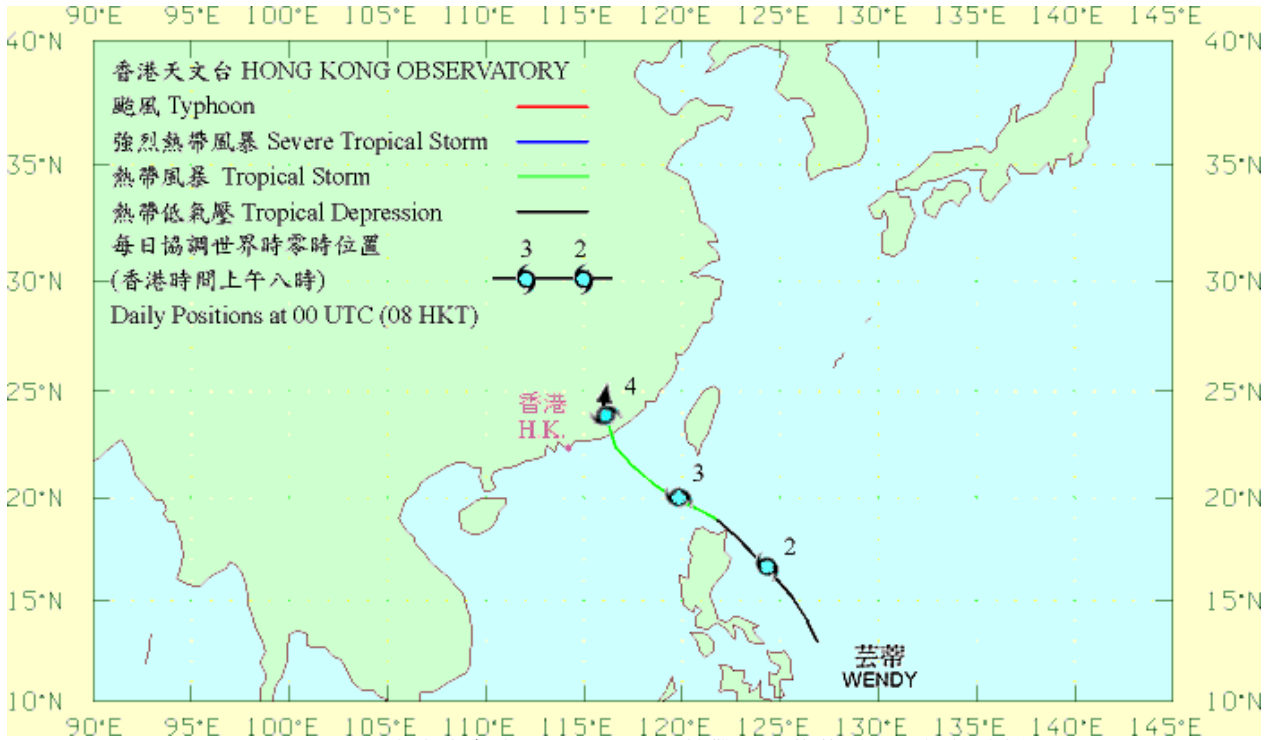


圖 3.5.1 一九九九年九月一日至四日熱帶風暴芸蒂 (9914) 的路徑圖。
 Figure 3.5.1 Track of Tropical Storm Wendy (9914) : 1 – 4 September 1999.

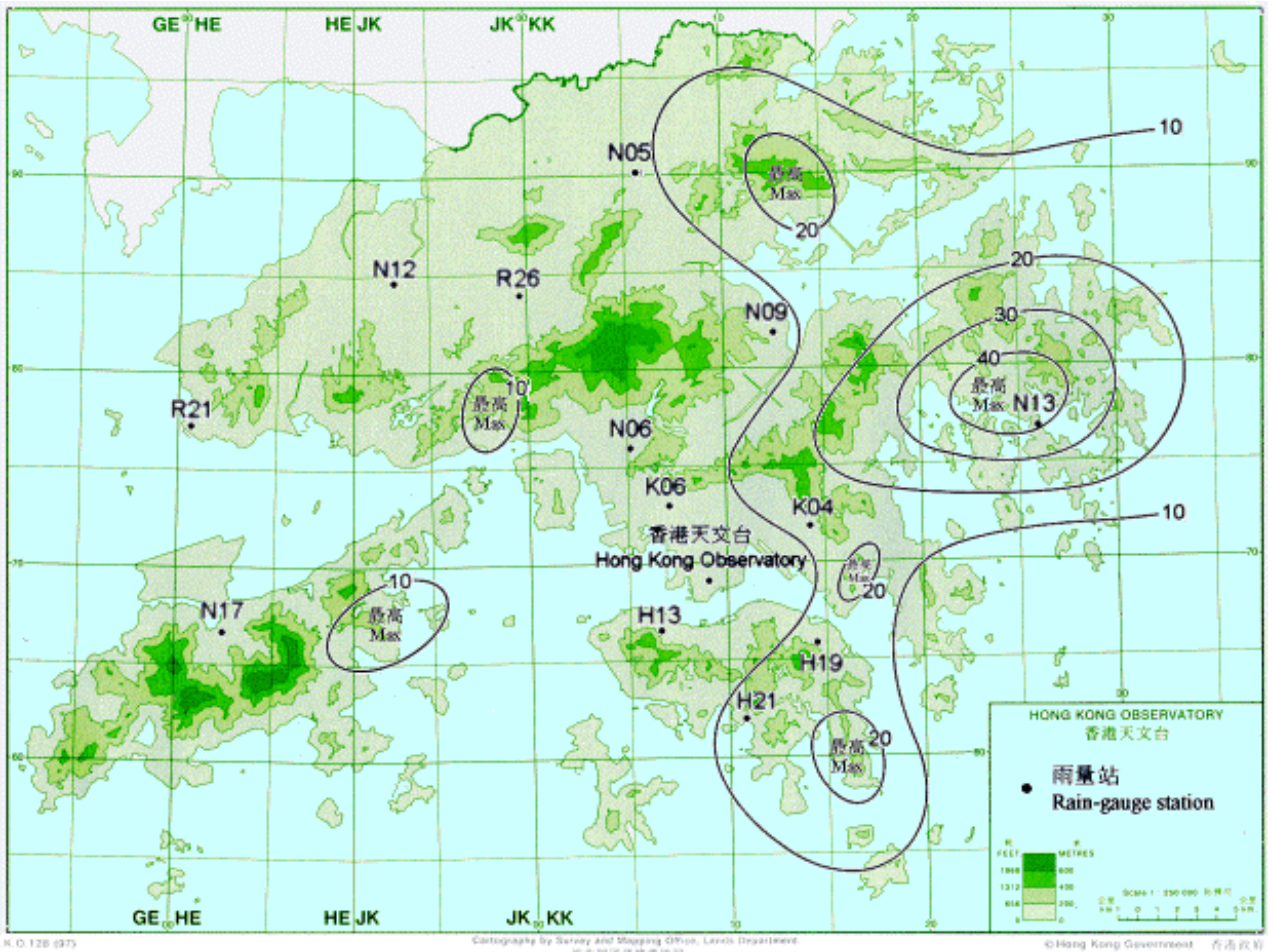


圖 3.5.2 一九九九年九月三日至五日的雨量分佈圖。
 Figure 3.5.2 Rainfall distribution on 3 – 5 September 1999.

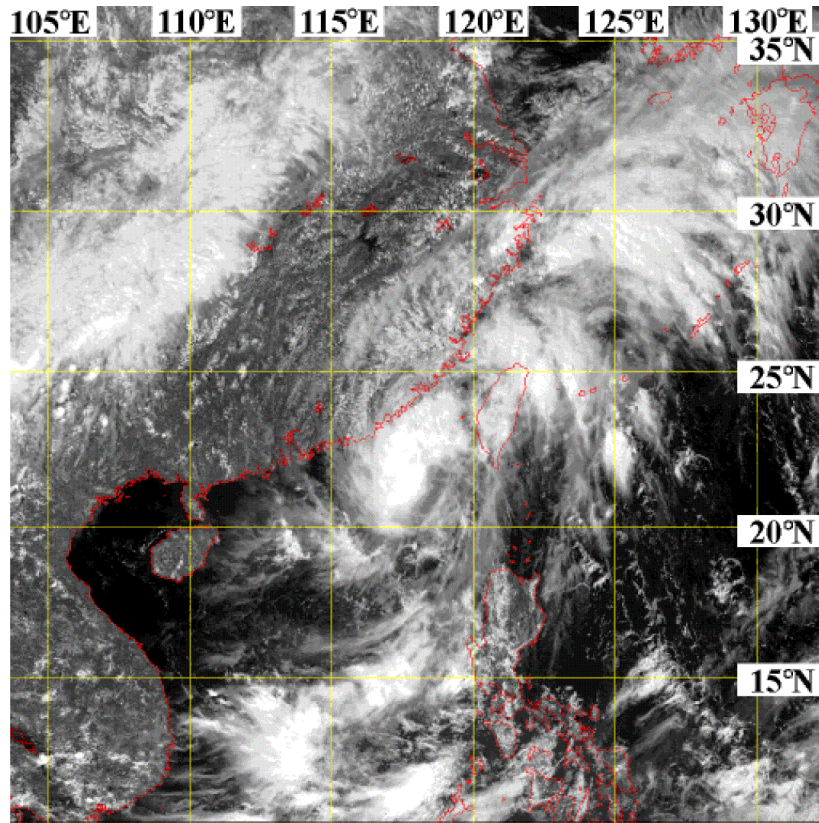


圖 3.5.3.a 一九九九年九月三日約下午2時芸蒂的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.5.3.a Visible imagery of Wendy at around 2 p.m. on 3 September 1999
 (originally captured by GMS-5 of JMA).

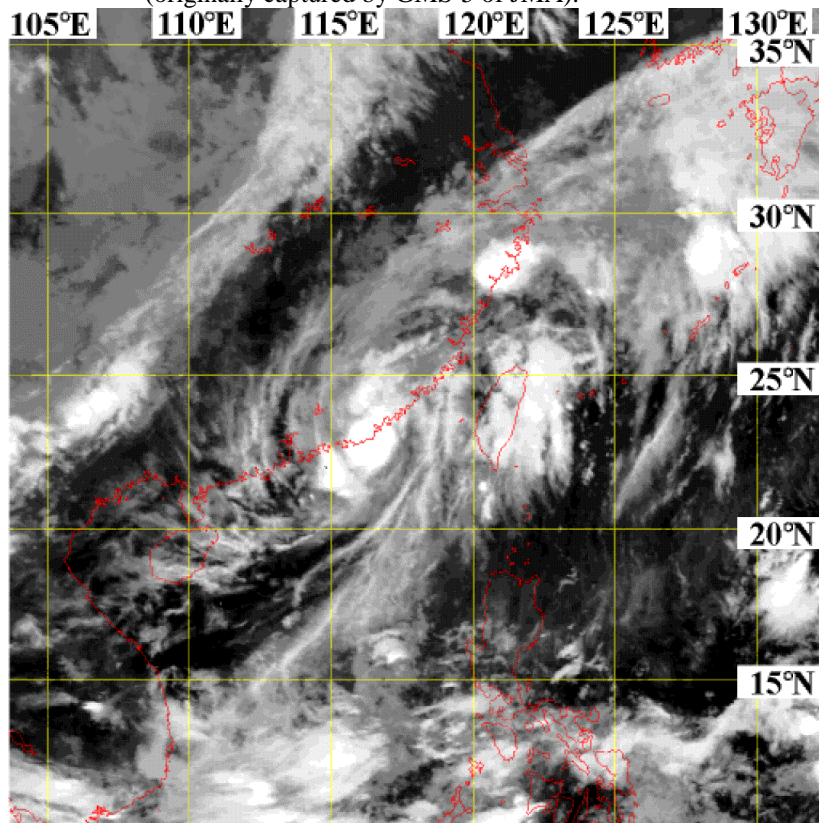


圖 3.5.3.b 一九九九年九月四日約上午2時芸蒂的紅外線衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.5.3.b Infra-red imagery of Wendy at around 2 a.m. on 4 September 1999
 (originally captured by GMS-5 of JMA).

3.6

颱風約克(9915)
九月十二日至十七日

約克在九月十二日於馬尼拉東北約420公里處發展為一熱帶低氣壓。它向西移動，橫過呂宋北部，並導致18人在山泥傾瀉中死亡。

約克進入南海後，在九月十三日增強為一熱帶風暴，其移動途徑隨後變得不規則。約克初時向北推進，在九月十四日增強為一強烈熱帶風暴。它然後轉向西北移動，跟著差不多停留不動，並在翌日晚上達至颱風強度。在九月十六日清晨，約克加速至每小時約20公里，並開始趨向香港。當時，約克的最高持續風速及最低中心氣壓估計約為每小時130公里及965百帕斯卡。約克在香港肆虐後，便進入珠江口，然後於黃昏時分在珠海附近登陸並減弱為一強烈熱帶風暴。約克繼續向內陸推進，在翌日迅速變為一低壓區。

約克在珠海造成廣泛水浸。廣東省共有15人死亡及700人受傷，直接經濟損失約為2億多元人民幣。在澳門，約克釀成一人損傷及120多宗意外，兩條連接澳門及氹仔大橋封閉，來往澳門及香港的直升機服務亦要停航。

在本港，一號戒備信號在九月十三日上午10時45分懸掛，當時約克位於香港東南約650公里處。本港天氣酷熱及有幾陣驟雨，在九月十四日大致吹和緩偏北風。隨著約克增強為一強烈熱帶風暴並趨向廣東沿岸，風勢開始增強。三號強風信號在九月十五日上午10時15分懸掛。

在約克的雨帶影響下，本港天氣開始轉壞及有幾陣狂風驟雨。約克差不多停留不動後，在該晚增強為一颱風。約克的風眼在雷達及衛星圖像中均可看見。隨著約克的逼近，本港離岸地區風力達至烈風程度，八號西北烈風或暴風信號在九月十六日清晨3時15分懸掛。本地風勢在隨後數小時迅速增強，九號烈風或暴風風力增強信號在上午5時20分懸掛，而十號颶風信號在上午6時45分懸掛。這是自1983年以來的第一個十號颶風信號。此信號懸掛了11小時，是歷來最長的。約克亦是本年需要懸掛九號或更高風球的第二個熱帶氣旋。在一月至九月期間懸掛了兩次九號或更高風球的情況，今年是一九六四年以來的第一次。

本港在九月十六日受颶風吹襲，初時本地吹東北風，後轉吹西南風。約克的風眼橫過時，本地風力顯著減弱。約克的風眼在上午10時左右最接近香港天文台總部，當時它位於天文台西南偏南約20公里處。

約克向西北偏西移動，以每小時約10公里的速度在南丫島及長洲附近掠過，然後橫越大嶼山西南部。在約克影響香港期間，各站錄得的最低瞬時海平面氣壓如下：-

站	最低瞬時海平面氣壓	時間	日期/月份
香港天文台總部	976.1百帕斯卡	上午 8 時 09 分	16/9
京士柏	976.6百帕斯卡	上午 8 時 11 分	16/9
橫瀾島	970.7百帕斯卡	上午 7 時 57 分	16/9
長洲	973.8百帕斯卡	上午 8 時 36 分	16/9

受約克的影響，橫瀾島錄得最高每小時平均風速為151公里，最高陣風則達每小時234公里。這陣風記錄是橫瀾島歷來最高的。而長洲錄得最高每小時平均風速為112公里，最高陣風則達每小時182公里。當約克進入珠江口，香港普遍轉吹西南風。

約克橫過珠江口後，在珠海附近登陸並減弱為一強烈熱帶風暴。颶風也不再影響香港，因此天文台在下午5時45分改掛八號西南烈風或暴風信號。由於吹襲本港的西南烈風已減

弱，天文台便在晚上10時10分轉掛三號強風信號。隨著約克的遠離，本地風勢繼續減弱。所有熱帶氣旋警告信號在九月十七日零時45分除下。

在約克的影響下，一名風帆手在長洲被巨浪捲走64小時後被發現死亡。另一男子在九月十六日於將軍澳滑倒後喪生。再者，超過500多人受傷，其中11名情況嚴重。共有800多個招牌塌下及4 000多棵大樹被吹倒。逾90條道路局部封閉。根據報章所報導，直接經濟損失約為數十億港元。

灣仔數幢大廈的玻璃幕牆給颶風吹落，其中稅務大樓、入境事務大樓及灣仔政府大樓共有400多塊玻璃被吹毀。一天秤亦被吹塌，擊中附近一幢大廈後，倒在灣仔謝斐道上，引致懷疑洩漏煤氣，共25人被迫要疏散。在荃灣，一煙囪被吹斷，塌落荃灣路上。另一貨櫃辦公室也被吹落海，在皇后碼頭附近漂浮。

約克帶來的暴雨造成64宗水浸，大部份位於新界區。超過300多人要遷離，包括受山泥傾瀉及水浸威脅的91名深井新村居民。約400個漁排受影響，其中189漁戶報稱損失嚴重。在錦田、打鼓嶺、上水及大埔等地，超過340多公頃農田被浸，合約800農戶損失慘重。

在惡劣天氣影響下，本港海、陸、空交通皆陷癱瘓。巴士、渡輪、輕鐵及九廣鐵路一律停駛。超過470多班航機在惡劣天氣下延誤或被迫取消，共80 000多名乘客受影響。

在約克的吹襲下，新界及九龍區多處電力中斷。消防處共出動460多次，拯救因電力中斷而被困升降機中的乘客。在長洲及西貢等地，食水供應亦一度停頓。

在海上，颱風約克亦造成嚴重毀壞。一艘貨輪在大嶼山以西沉沒，但五名船員全獲飛行服務隊拯救。另兩艘船隻擱淺。一艘運載石油氣貨船被吹往赤鱸角，引致機場北跑道在九月十六日封閉。西貢多艘船隻及遊艇擱淺或受到損壞。

在九月十七日，數萬架貨櫃車堵塞了所有通往葵涌貨櫃碼頭的的道路，這是歷來最嚴重的交通擠塞。另外，約60 000名新界居民受到停電影響。在九月十七日，20多間學校需要停課，逾20 000名學生受影響。

表3.6.1-3.6.3分別是約克影響香港時各站所錄得的最高風速、日雨量及最高潮汐資料。圖3.6.1是約克的路徑圖。圖3.6.2是約克橫過香港時，長洲錄得的風向、風速及氣壓之變化。約克的氣旋性流場顯示在圖3.6.3。圖3.6.4是約克影響香港期間的雨量分佈。約克的衛星雲圖及雷達回波圖則顯示於圖3.6.5-3.6.6。而約克在香港造成的破壞可參見圖3.6.7-3.6.12。



3.6

Typhoon York (9915) 12 - 17 September 1999

York developed as a tropical depression about 420 km northeast of Manila on 12 September. Tracking westwards, York swept across the northern part of Luzon where eighteen people were killed in landslides.

Entering the South China Sea, York intensified into a tropical storm on 13 September. Its movement then became erratic. Heading north at first, York strengthened into a severe tropical storm on 14 September. It then turned northwestwards before becoming almost stationary and attaining typhoon strength the following night. York picked up speed to about 20 km/h and began to head towards Hong Kong on the early morning of 16 September. The maximum sustained winds and minimum sea-level pressure near its centre were estimated to be 130 km/h and 965 hPa. After battering Hong Kong, York entered the Zhujiang Kou (Pearl River Estuary). It made landfall near Zhuhai and weakened into a severe tropical storm that evening. Moving further inland, York rapidly became an area of low pressure the next day.

York caused widespread flooding in Zhuhai. Fifteen people were killed and 700 were injured in Guangdong. Direct economic losses were put at 200 million RMB. In Macau, one person was injured and more than 120 other incidents were reported. Both bridges linking the mainland with Taipa Island and Coloane were forced to close. The Macau-Hong Kong helicopter service was suspended.

In Hong Kong the Standby Signal No. 1 was hoisted at 10.45 a.m. on 13 September when York was about 650 km to the southeast. It was hot with a few showers. Local winds were mainly moderate northerly on 14 September. But as York intensified into a severe tropical storm and headed towards the coast of Guangdong, local winds started to strengthen from the north. The Strong Wind Signal No. 3 was hoisted at 10.15 a.m. on 15 September.

Under the influence of York's rainbands, the weather began to deteriorate with a few squally showers in Hong Kong that day. York became almost stationary and soon intensified into a typhoon that night. An eye was discernible on radar and satellite imageries. As York approached Hong Kong, local winds reached gale force offshore and the No. 8 NORTHWEST Gale or Storm Signal was hoisted at 3.15 a.m. on 16 September. Winds strengthened rapidly in the next few hours. The Increasing Gale or Storm Signal No. 9 was hoisted at 5.20 a.m. and the Hurricane Signal No. 10 at 6.45 a.m. This was the first time since 1983 that the No. 10 signal was hoisted. The signal was in force for 11 hours, the longest on record. York was also the second tropical cyclone necessitating the hoisting of No. 9 or higher signals in the year. The last time that No. 9 or higher signals had to be hoisted on two separate occasions between January and September was in 1964.

Winds of hurricane force, firstly northeasterly and then southwesterly, buffeted Hong Kong on 16 September. Local winds experienced a temporary lull during the eye's passage. The eye of York was closest to the Hong Kong Observatory Headquarters at around 10 a.m. when it was about 20 km to the south-southwest.

Moving west-northwestwards at a speed of about 10 km/h, York skirted Lamma Island and Cheung Chau before crossing the southwestern part of Lantau. The lowest instantaneous mean sea-level pressures recorded at some selected stations during the passage of York were as follows :-

<u>Station</u>	<u>Lowest instantaneous mean sea-level pressure</u>	<u>Time</u>	<u>Date/Month</u>
Hong Kong Observatory Headquarters	976.1 hPa	8.09 a.m.	16/9
King's Park	976.6 hPa	8.11 a.m.	16/9
Waglan Island	970.7 hPa	7.57 a.m.	16/9
Cheung Chau	973.8 hPa	8.36 a.m.	16/9

During the passage of York, a maximum hourly wind of 151 km/h and a maximum gust of 234 km/h were recorded at Waglan. The gust is the highest recorded at Waglan. At Cheung Chau, a maximum hourly wind of 112 km/h and a maximum gust of 182 km/h were recorded. As York entered the Zhujiang Kou, local winds over most parts of Hong Kong turned southwesterly.

After crossing the Zhujiang Kou, York made landfall near Zhuhai and weakened into a severe tropical storm. With hurricane force winds no longer being experienced in Hong Kong, the No. 10 signal was replaced by the No. 8 SOUTHWEST Gale or Storm Signal at 5.45 p.m. As the southwesterly gales affecting Hong Kong weakened, the Strong Wind Signal No. 3 was hoisted at 10.10 p.m. to replace signal No. 8. Local winds subsided further as York moved away from Hong Kong. All tropical cyclone warning signals were lowered at 0.45 a.m. on 17 September.

During the passage of York, one windsurfer was found dead 64 hours after being swept away in high seas off Cheung Chau. Another man died after slipping in Tseung Kwan O on 16 September. More than 500 people were injured, 11 of them seriously. A total of 800 signboards collapsed and over 4 000 trees were uprooted. About 90 roads were rendered impassable. Direct economic losses amounted to several billion H.K. dollars according to press report.

York shattered the curtain walls of several buildings in Wan Chai. Among them, Revenue Tower, Immigration Tower and Wan Chai Tower had together more than 400 glass panes smashed. A crane was blown down and struck a nearby flat before crashing onto Jaffe Road in Wan Chai. This resulted in a suspected gas leak and 25 people had to be evacuated. In Tsuen Wan, an industrial chimney collapsed onto

Tsuen Wan Road. A mobile office in a transport container was blown into the water by high winds, floating near Queen's Pier.

Heavy rain associated with York triggered off 64 cases of flooding, mostly in the New Territories. More than 300 people had to flee their homes, including 91 from Sham Tseng San Tsuen where there was a threat of landslide and flooding. About 400 fish farms were affected and 189 fish farmers reported serious damage. More than 340 hectares of farmland, mainly in Kam Tin, Ta Kwu Ling, Sheung Shui and Tai Po, were devastated where 800 farmers reported heavy loss.

Severe weather disabled local as well as international traffic. Bus, ferry, tram, Light Rail Transit and Kowloon-Canton Railway services were all suspended. More than 470 flights were delayed or cancelled in adverse weather and about 80 000 passengers were affected.

York caused numerous power cuts, mostly in the New Territories and Kowloon. The fire services received about 460 calls for assistance, mainly to rescue people trapped in lifts where power failed. Water supply was interrupted in Cheung Chau and Sai Kung.

Typhoon York also wreaked havoc at sea. A cargo vessel sank west of Lantau Island, but its five crew were airlifted by a Government Flying Service helicopter. Two other vessels went aground. A liquefied petroleum gas tanker drifted close to Chek Lap Kok, forcing the closure of the airport's northern runway on 16 September. Several boats and yachts were blown ashore or damaged in Sai Kung.

Tens of thousands of container trucks paralyzed all roads leading to and from Kwai Chung container port on 17 September. This was the worse traffic jam on record. About 6 000 New Territories residents remained without power. Some 20 schools were closed on 17 September, affecting 20 000 students.

Information on wind, rainfall and tide during the passage of York is given in Tables 3.6.1 - 3.6.3. Figure 3.6.1 shows the track of York. The time series of wind direction, wind speed and pressure at Cheung Chau showing the passage of the eye of York are given in Figure 3.6.2, and the cyclonic characteristics of York's wind field in Figure 3.6.3. The rainfall distribution associated with York is shown in Figure 3.6.4. Satellite and radar imageries of York are given in Figures 3.6.5 - 3.6.6. And Figures 3.6.7 - 3.6.12 show some of the damage caused by York.

表 3.6.1 在約克影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.6.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signals for York

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)		
中環	Central	東南偏東 ESE	161	16/9	1416	東 E	77	16/9	1500
中環廣場	Central Plaza	-	198	16/9	0614	-	133	16/9	0800
赤鱗角 (機場)	Chek Lap Kok (Airport)	北 N	113	16/9	0720	北 N	76	16/9	0800
長洲	Cheung Chau	東北 NE	182	16/9	0838	西南偏南 SSW	112	16/9	1600
長沙灣	Cheung Sha Wan	東北偏北 NNE 東北 NE	113 113	16/9 16/9	0739 0925	東北 NE	40	16/9	0900
京士柏	King's Park	東北偏北 NNE	149	16/9	0738	東北偏北 NNE	65	16/9	0800
流浮山	Lau Fau Shan	北 N	158	16/9	0910	北 N	104	16/9	0800
西貢	Sai Kung	東北偏北 NNE	211	16/9	0645	東北偏北 NNE	108	16/9	0700
沙螺灣	Sha Lo Wan	東北偏北 NNE	151	16/9	0915	東北偏東 ENE	85	16/9	1100
沙田	Sha Tin	北 N	153	16/9	0912	北 N	51	16/9	0800
石崗	Shek Kong	東北偏北 NNE 東北偏東 ENE	137 137	16/9 16/9	0944 1155	東北偏北 NNE	68	16/9	1000
天星碼頭	Star Ferry	東南偏東 ESE	149	16/9	1324	東南偏東 ESE	70	16/9	1300
打鼓嶺	Ta Kwu Ling	東北 NE	121	16/9	1043	東北 NE	58	16/9	1100
大尾篤	Tai Mei Tuk	北 N	180	16/9	0805	北 N	112	16/9	1000
鯉魚湖	Tsak Yue Wu	東北偏北 NNE	122	16/9	0505	東北偏北 NNE	43	16/9	0600
青衣	Tsing Yi	東南 SE	182	16/9	1409	東南偏南 SSE	101	16/9	1700
屯門	Tuen Mun	東北 NE	133	16/9	0927	東南偏南 SSE	49	16/9	1700
橫瀾島	Waglan Island	東北偏北 NNE	234	16/9	0514	東北偏北 NNE	151	16/9	0600
黃竹坑	Wong Chuk Hang	東北偏東 ENE	146	16/9	0801	東北偏東 ENE	54	16/9	0800

表 3.6.2 約克影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位為毫米)
Table 3.6.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of York

站 (參閱圖 3.6.4) Station (see Fig. 3.6.4)	九月十三日 13 Sep	九月十四日 14 Sep	九月十五日 15 Sep	九月十六日 16 Sep	九月十七日 17 Sep	九月十八日 18 Sep	總雨量 Total
香港天文台 Hong Kong Observatory	1.4	0.4	1.4	276.0	5.0	微量 Trace	284.2
H13 半山區 Mid-levels	1.5	0.5	0.5	[237.0]	2.5	0.0	[242.0]
H19 筲箕灣 Shau Kei Wan	0.0	0.5	2.0	[193.0]	11.5	0.0	[207.0]
H21 淺水灣 Repulse Bay	0.0	1.0	1.5	[138.5]	5.0	0.0	[146.0]
K04 秀茂坪 Sau Mau Ping	1.0	0.0	2.5	[241.5]	5.5	0.0	[250.5]
K06 長沙灣 Cheung Sha Wan	3.0	0.0	1.5	[238.5]	4.0	0.0	[247.0]
N06 葵涌 Kwai Chung	0.0	0.0	0.5	[233.5]	4.5	0.0	[238.5]
N09 沙田 Sha Tin	0.0	0.0	0.5	[281.0]	5.0	1.0	[287.5]
N12 元朗 Yuen Long	0.0	0.0	1.5	[143.0]	9.0	13.0	[166.5]
N17 東涌 Tung Chung	0.0	0.0	0.5	[86.5]	9.5	5.5	[102.0]
R21 踏石角 Tap Shek Kok	0.0	0.0	[0.5]	[141.0]	[7.0]	[1.0]	[149.5]
R26 石崗 Shek Kong	0.0	0.0	5.0	[277.0]	[8.0]	[1.0]	[291.0]
R31 大尾篤 Tai Mei Tuk	0.0	0.0	1.0	[190.0]	[2.0]	[1.0]	[194.0]

註： [] 基於不完整的每小時雨量數據。
Note : [] based on incomplete hourly data.

表 3.6.3 約克影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮
Table 3.6.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of York

站 (參閱圖 1.1) Station (see Fig. 1.1)	最高潮位 (海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮 (天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time	高度 (米) Height (m)	日期/月份 Date/Month	時間 Time
	鯪魚涌 Quarry Bay	2.39	16/9	0.42 a.m.	0.74	16/9
橫瀾島 Waglan Island	2.50	16/9	1.13 a.m.	0.73	16/9	10.11 a.m.

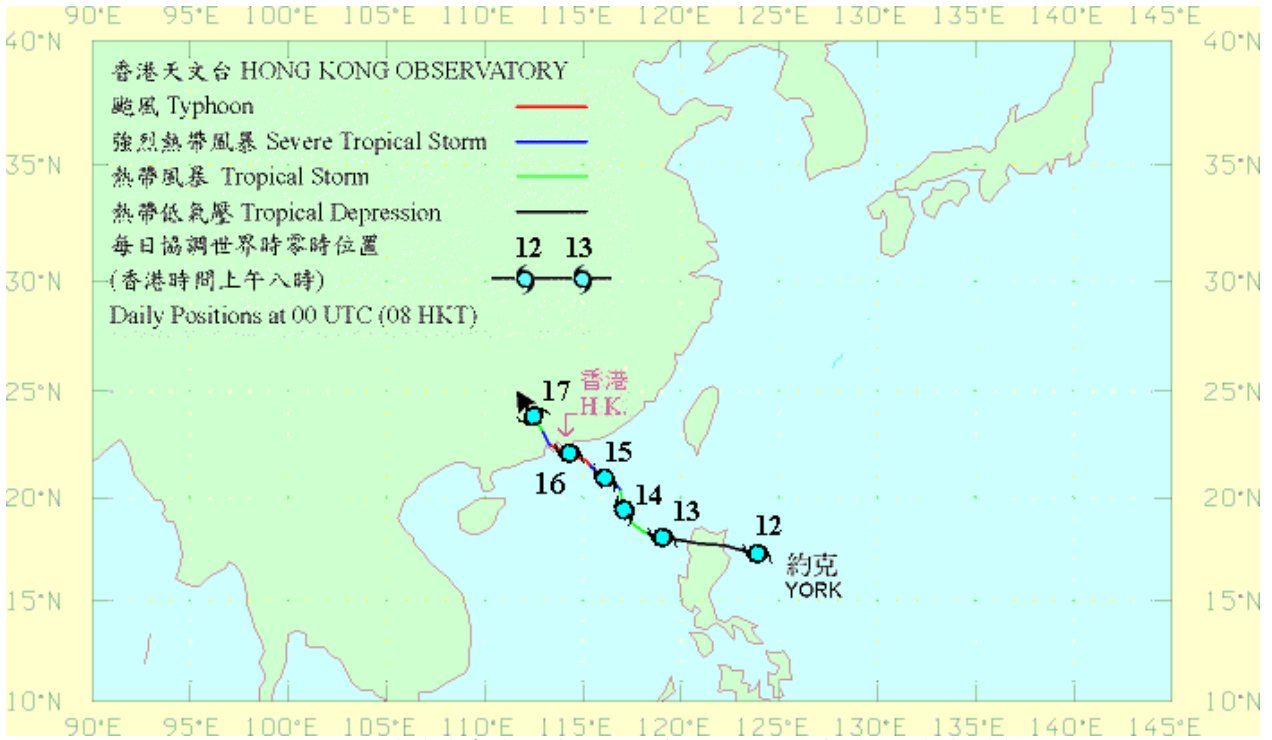


圖 3.6.1.a 一九九九年九月十二日至十七日颱風約克 (9915) 的路徑圖。

Figure 3.6.1.a Track of Typhoon York (9915) : 12 – 17 September 1999.

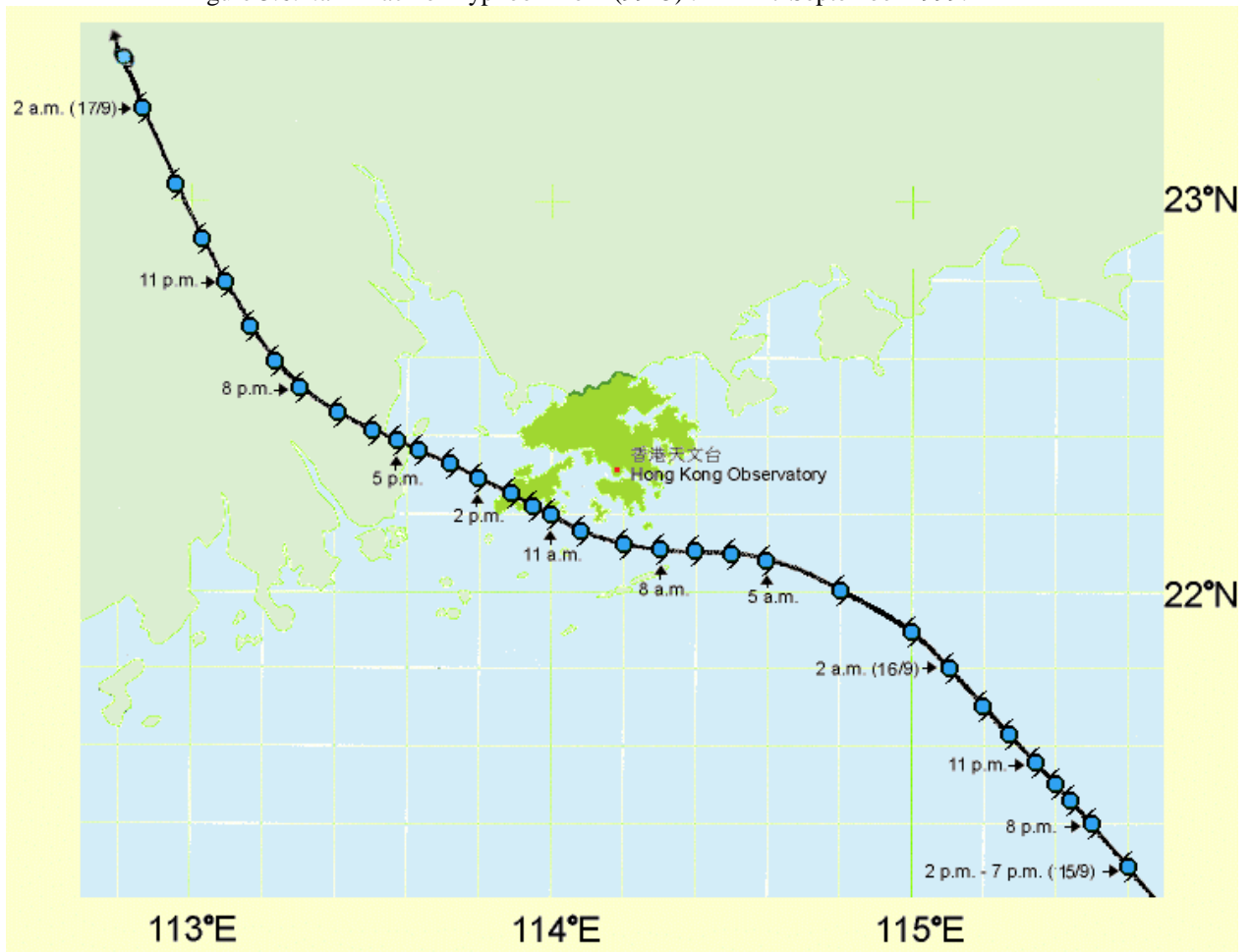


圖 3.6.1.b 一九九九年九月十六日約克橫過香港時的路徑圖。

Figure 3.6.1.b Track of York over Hong Kong on 16 September 1999.

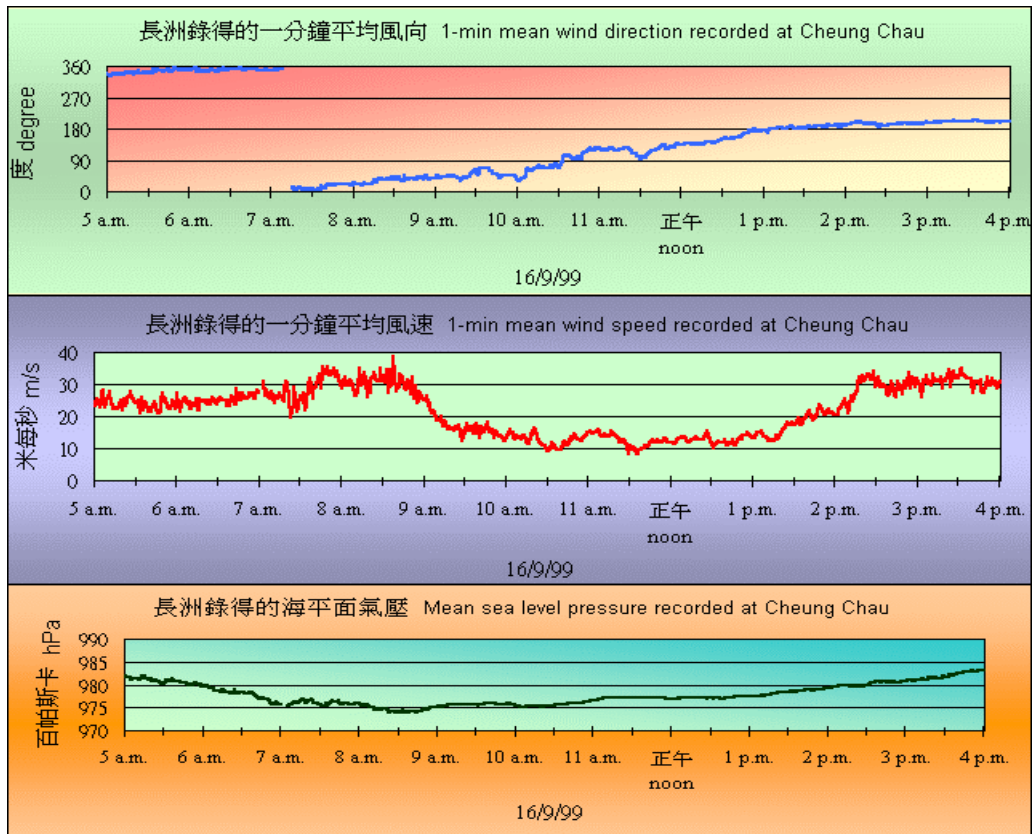


圖 3.6.2 一九九九年九月十六日長洲自動氣象站錄得的風向、風速及氣壓。
 Figure 3.6.2 Traces of wind direction, wind speed and pressure recorded at Cheung Chau automatic weather station on 16 September 1999.

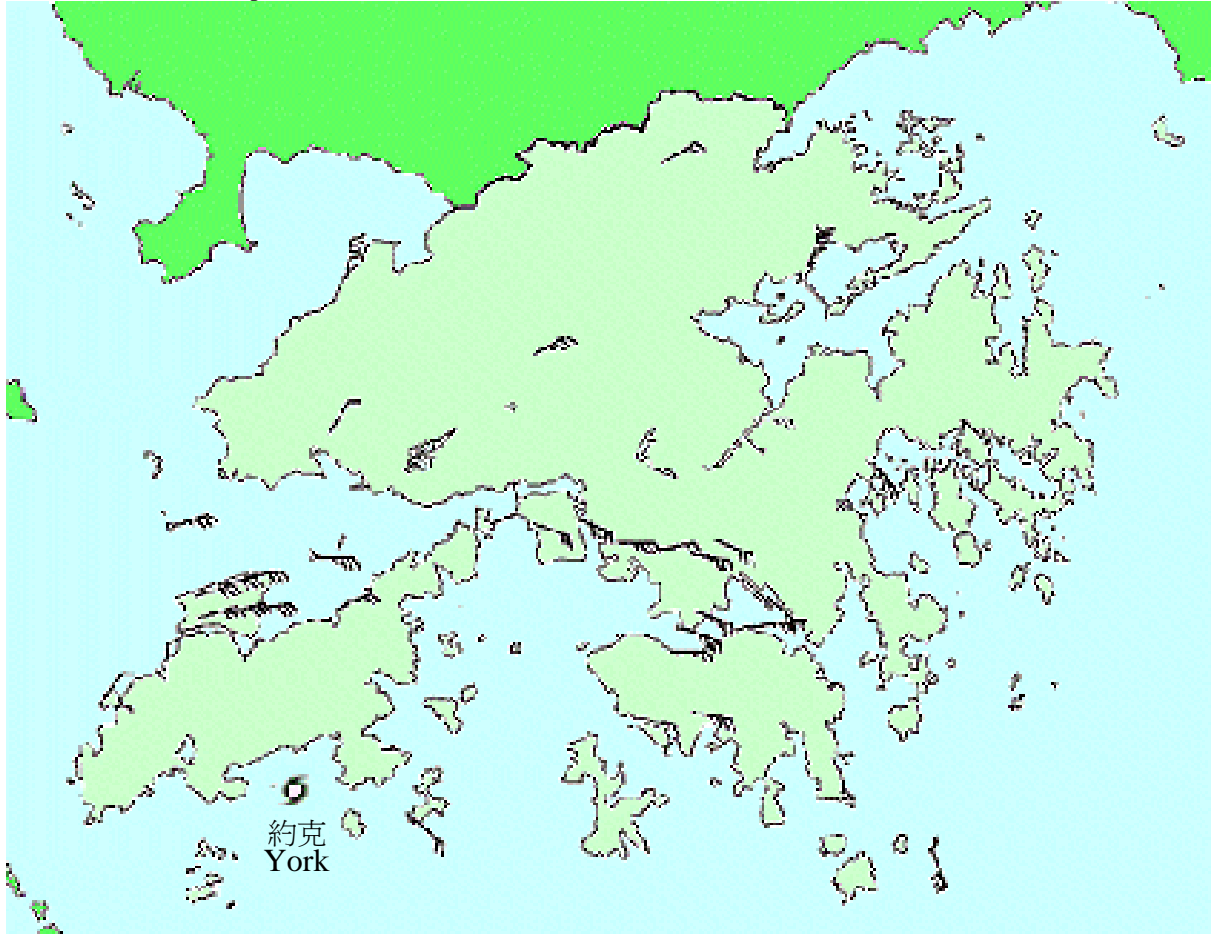


圖 3.6.3 一九九九年九月十六日正午12時香港各站錄得的風向和風速。
 Figure 3.6.3 Winds recorded at various stations in Hong Kong at noon on 16 September 1999.

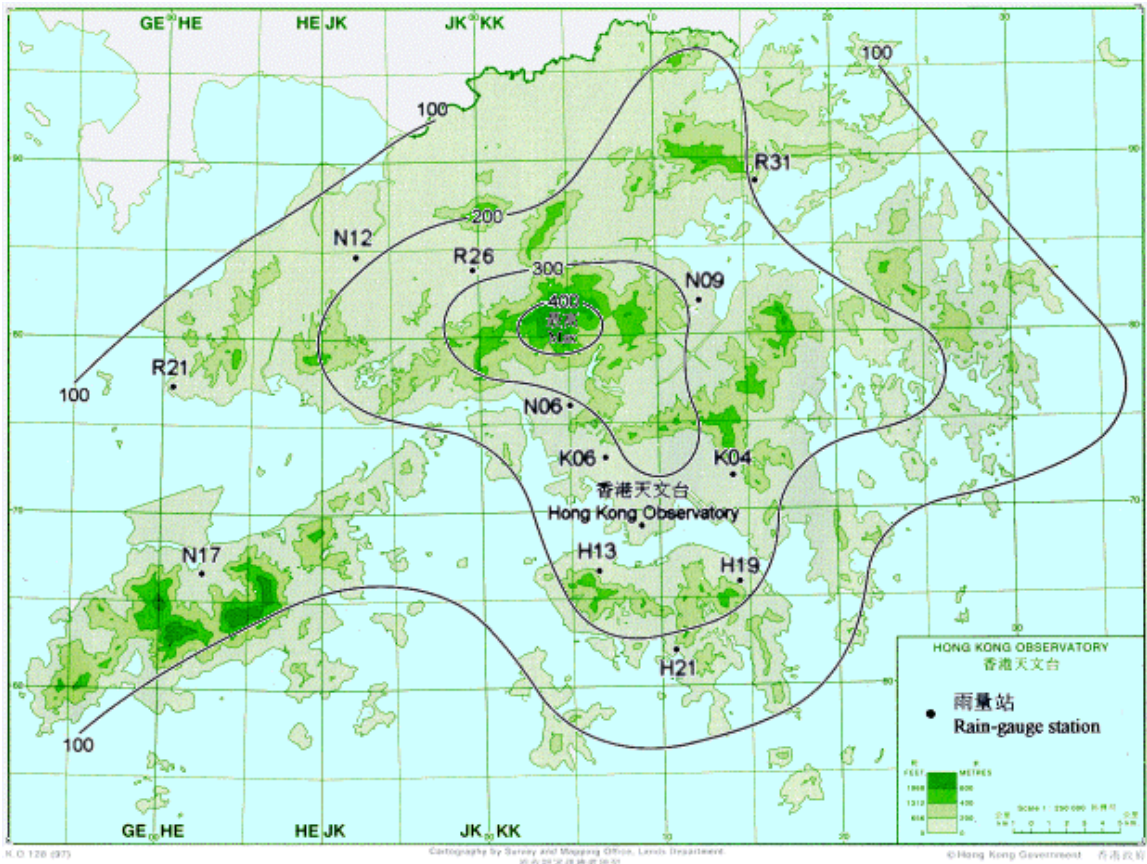


圖 3.6.4 一九九九年九月十三日至十八日的雨量分佈圖。
 Figure 3.6.4 Rainfall distribution on 13 – 18 September 1999.

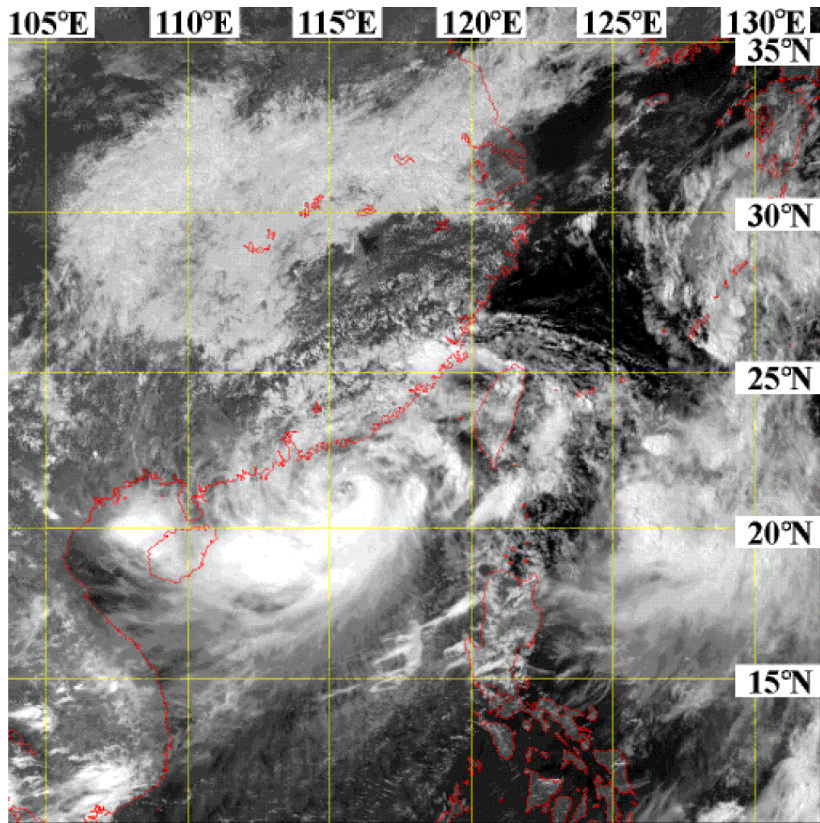


圖 3.6.5.a 一九九九年九月十五日約下午2時約克的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.6.5.a Visible imagery of York at around 2 p.m. on 15 September 1999
 (originally captured by GMS-5 of JMA).

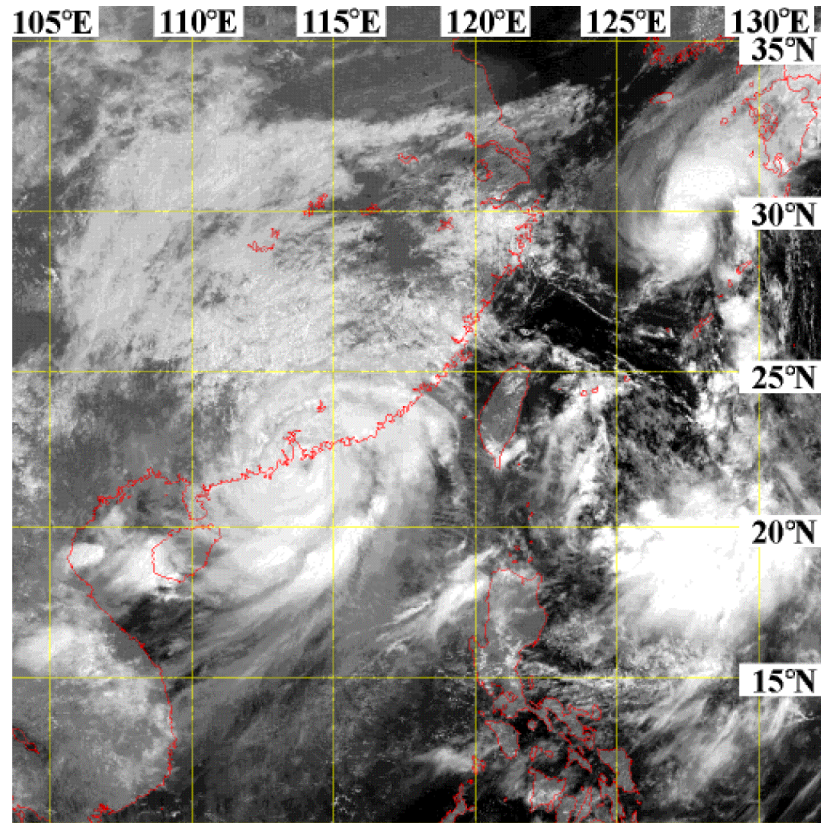


圖 3.6.5.b 一九九九年九月十六日約上午11時約克的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.6.5.b Visible imagery of York at around 11 a.m. on 16 September 1999
 (originally captured by GMS-5 of JMA).

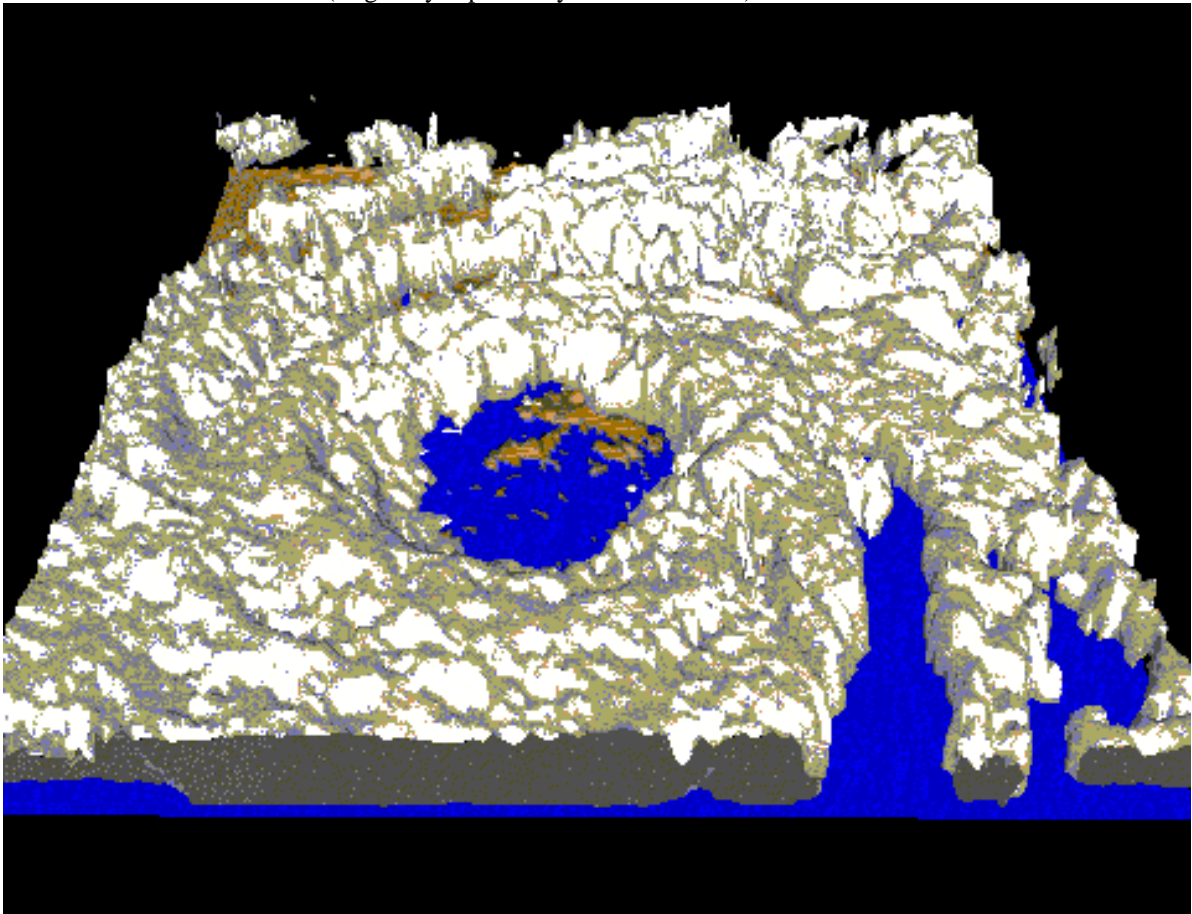


圖 3.6.6 一九九九年九月十六日上午10時30分的立體雷達回波圖片。
 Figure 3.6.6 3-D Radar echoes captured at 10.30 a.m. on 16 September 1999.

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圖 3.6.7 灣仔數幢大廈的玻璃幕牆給颶風吹落（東方日報提供）。
 Figure 3.6.7 Hurricane winds shattered the curtain walls of several buildings in Wan Chai (by courtesy of Oriental

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圖 3.6.8 在灣仔，一天秤被吹塌後擊中附近一幢大廈（大公報提供）。
 Figure 3.6.8 A crane blown down and struck a nearby flat in Wan Chai (by courtesy of Ta Kung Pao).

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圖 3.6.9 一貨櫃辦公室被捲落海，在皇后碼頭附近漂浮（大公報提供）。
 Figure 3.6.9 A mobile office in a transport container blown into the water, floating near Queen's Pier (by courtesy of Ta Kung Pao).

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圖 3.6.10 西貢多艘遊艇被吹至擱淺（大公報提供）。
 Figure 3.6.10 Yachts blown ashore in Sai Kung (by courtesy of Ta Kung Pao).

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圖 3.6.11 在葵涌貨櫃碼頭，一批貨物被吹倒（經濟日報提供）。
 Figure 3.6.11 Containers blown down at Container Terminal in Kwai Chung (by courtesy of Hong Kong Economic Times).

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圖 3.6.12 荃灣圓玄學院一大樹被吹至連根拔起（大公報提供）。
 Figure 3.6.12 A tree uprooted at Yuen Yuen Hok Yuen in Tsuen Wan (by courtesy of Ta Kung Pao).

3.7

強烈熱帶風暴錦雯(9919)
九月二十四日至二十六日

一熱帶低氣壓在九月二十四日於香港以南約410公里處形成，定名為錦雯。錦雯在南海北部採取東北偏北路徑移動，在當晚增強為一熱帶風暴。它隨後變得移動緩慢並在九月二十五日增強為一強烈熱帶風暴。受到較涼的東北季候風影響，錦雯在當日黃昏減弱為一熱帶風暴。它然後轉向西北移動直趨香港，在九月二十六日中午前登陸。橫過香港後，錦雯隨即在當日下午減弱為一熱帶低氣壓並迅速變為一低壓區。

在香港，一號戒備信號在九月二十四日上午9時40分懸掛，當時錦雯位於香港以南約390公里。在錦雯及東北季候風的共同影響下，翌日本地轉吹和緩至清勁偏北風。錦雯增強為一強烈熱帶風暴並趨近香港，三號強風信號在九月二十五日下午3時40分懸掛。

錦雯在翌日繼續逼近，本港風力進一步增強，八號西北烈風或暴風信號在九月二十六日上午5時20分懸掛。錦雯是今年引致天文台需要懸掛八號或以上熱帶氣旋警告信號的第五個熱帶氣旋。懸掛了五次八號或更高風球的情況，今年亦是自一九六四年以來的第一次。

錦雯以西北途徑移動，時速約每小時25公里，在九月二十六日上午10時45分左右掠過西貢。隨著，它轉向西北偏西移動並橫越新界，途經沙田、錦田及流浮山，然後在中午時分進入后海灣。

錦雯在九月二十六日約上午11時正最接近香港天文台總部，當時它位於天文台東北偏北約10公里處。錦雯掠過後，香港各區開始轉吹西南風。八號西南烈風或暴風信號在上午11時20分懸掛，取代了八號西北烈風或暴風信號。在錦雯影響香港期間，各站錄得的最低瞬時海平面氣壓如下：-

站	最低瞬時海平面氣壓	時間	日期/月份
香港天文台總部	1004.6百帕斯卡	上午 10 時 39 分	26/9
京士柏	1004.7百帕斯卡	上午 10 時 25 分	26/9
沙田	1003.2百帕斯卡	上午 11 時 10 分	26/9
流浮山	1005.3百帕斯卡	下午 12 時 17 分	26/9

受錦雯的影響，大帽山錄得最高每小時平均風速為79公里，最高陣風則達每小時121公里。橫瀾島錄得最高每小時平均風速為70公里，最高陣風則達每小時104公里。錦雯離開香港並減弱為一熱帶低氣壓後，天文台在下午2時10分改掛三號強風信號。隨著錦雯的遠離，本地風勢繼續減弱，所有熱帶氣旋警告信號在下午3時20分除下。

受錦雯的吹襲，海面非常大浪，一名男子在泊於昂船州的貨船上因船身搖晃不定而失足跌倒後死亡。本地約有23人受傷及10宗水浸的報告。共146人入住31個臨時庇護站。香港交通亦受影響，大部份渡輪及一些巴士服務暫停，約100班航機延誤或取消。

表3.7.1-3.7.3分別是錦雯影響香港時各站所錄得的最高風速、日雨量及最高潮汐資料。圖3.7.1-3.7.4分別是錦雯的路徑圖、香港的雨量分佈、衛星雲圖及雷達回波圖。

3.7

**Severe Tropical Storm Cam (9919)
24 - 26 September 1999**

A tropical depression named Cam developed about 410 km south of Hong Kong on 24 September. Taking on a north-northeastward course over the northern part of the South China Sea, Cam intensified into a tropical storm that night. It slowed down and became a severe tropical storm on 25 September. Under the influence of the relatively cool northeast monsoon, Cam weakened rapidly into a tropical storm that evening. It then turned northwestwards and headed towards Hong Kong. Cam made landfall before noon on 26 September. After traversing Hong Kong, Cam weakened rapidly into a tropical depression and degenerated into an area of low pressure that afternoon.

In Hong Kong the Standby Signal No. 1 was hoisted at 9.40 a.m. on 24 September when Cam was about 390 km to the south. Under the combined effect of Cam and the northeast monsoon, local winds became moderate to fresh northerly the next day. With Cam intensifying into a severe tropical storm and coming closer to Hong Kong, the Strong Wind Signal No. 3 was hoisted at 3.40 p.m. on 25 September.

Cam continued to edge closer to Hong Kong the next day. Local winds strengthened further and the No. 8 NORTHWEST Gale or Storm Signal was hoisted at 5.20 a.m. on 26 September. Cam was the fifth tropical cyclone in the year for which the No. 8 or higher signals had to be hoisted. The last time that No. 8 or higher signals had to be hoisted on five separate occasions was in 1964.

Moving northwestwards at a speed of about 25 km/h, Cam crossed Sai Kung at around 10.45 a.m. on 26 September. It then turned west-northwestwards and traversed the New Territories, passing near Sha Tin, Kam Tin and Lau Fau Shan, before entering Deep Bay at around noon.

Cam was closest to the Hong Kong Observatory Headquarters at around 11.00 a.m. on 26 September when it was about 10 km to the north-northeast. As the wind direction began to change to southwesterly in the wake of Cam, the No. 8 SOUTHWEST Gale or Storm Signal was hoisted at 11.20 a.m. to replace the No. 8 NORTHWEST Gale or Storm Signal. During the passage of Cam, the lowest instantaneous mean sea-level pressures recorded at some selected stations were as follows :-

<u>Station</u>	<u>Lowest instantaneous mean sea-level pressure</u>	<u>Time</u>	<u>Date/Month</u>
Hong Kong Observatory Headquarters	1004.6 hPa	10.39 a.m.	26/9
King's Park	1004.7 hPa	10.25 a.m.	26/9
Sha Tin	1003.2 hPa	11.10 a.m.	26/9
Lau Fau Shan	1005.3 hPa	12.17 p.m.	26/9

A maximum hourly wind of 79 km/h and a maximum gust of 121 km/h were recorded at Tai Mo Shan during the passage of Cam. At Waglan, a maximum hourly wind of 70 km/h and a maximum gust of 104 km/h were recorded. As Cam departed from Hong Kong and weakened into a tropical depression, the No. 8 signal was replaced by the Strong Wind Signal No. 3 at 2.10 p.m. Local winds subsided further as Cam moved away from Hong Kong. All tropical cyclone warning signals were lowered at 3.20 p.m.

During the passage of Cam, a man died after falling down a cargo vessel rolling in rough seas near Stonecutter Island. Some 23 people were injured and ten cases of flooding were reported. A total of 146 people sought refuge at 31 temporary shelters. Transportation was disrupted. Most ferry services and some bus services were suspended. About 100 flights were cancelled or delayed.

Information on wind, rainfall and tide during the passage of Cam is given in Tables 3.7.1-3.7.3. Figures 3.7.1 - 3.7.4 show respectively the track of Cam, the rainfall distribution in Hong Kong, satellite and radar imageries.

表 3.7.1 在錦雯影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.7.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signals for Cam

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)		
中環	Central	西北 NW	54	26/9	0905	西北 NW	27	26/9	1000
赤鱘角 (機場)	Chek Lap Kok (Airport)	西北 NW	79	26/9	1120	西北偏西 WNW	45	26/9	1200
長洲	Cheung Chau	西北偏西 WNW	90	26/9	1125	西北偏西 WNW	54	26/9	1200
長沙灣	Cheung Sha Wan	北 N	56	26/9	1021	西南偏西 WSW	13	26/9	1200
						西南偏南 SSW	13	26/9	1300
京士柏	King's Park	西北 NW	72	26/9	1001	西北偏北 NNW	31	26/9	1000
西貢	Sai Kung	北 N	96	26/9	0905	北 N	45	26/9	1000
沙螺灣	Sha Lo Wan	西北 NW	65	26/9	1200	西北偏北 NNW	31	26/9	1200
石崗	Shek Kong	西北 NW	83	26/9	1101	西北偏北 NNW	27	26/9	1100
天星碼頭	Star Ferry	西北偏西 WNW	79	26/9	1038	西北偏西 WNW	54	26/9	1100
		西 W	79	26/9	1043				
打鼓嶺	Ta Kwu Ling	東北 NE	77	26/9	1123	東北 NE	34	26/9	1200
大尾篤	Tai Mei Tuk	北 N	110	26/9	1043	北 N	56	26/9	1100
大帽山	Tai Mo Shan	西北偏西 WNW	121	26/9	1020	西北偏西 WNW	79	26/9	1100
		西北 NW	121	26/9	1027				
鯽魚湖	Tsak Yue Wu	東北偏北 NNE	96	26/9	0928	東北偏北 NNE	40	26/9	1000
青衣	Tsing Yi	西北 NW	87	26/9	1102	西北 NW	43	26/9	1100
屯門	Tuen Mun	西北 NW	63	26/9	1030	西北 NW	23	26/9	1200
		西北偏西 WNW	63	26/9	1153				
橫瀾島	Waglan Island	西北偏北 NNW	104	26/9	0940	西北偏北 NNW	70	26/9	1000
黃竹坑	Wong Chuk Hang	西北 NW	75	26/9	0957	西北偏西 WNW	25	26/9	1100

表 3.7.2 錦雯影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位為毫米)
Table 3.7.2 Daily rainfall amounts in millimetres recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Cam

站 (參閱圖 3.7.2) Station (see Fig. 3.7.2)	九月二十四日 24 Sep	九月二十五日 25 Sep	九月二十六日 26 Sep	總雨量 Total
香港天文台 Hong Kong Observatory	0.0	1.4	26.7	28.1
H13 半山區 Mid-levels	0.0	1.5	25.0	26.5
H19 筲箕灣 Shau Kei Wan	0.0	1.0	19.0	20.0
H21 淺水灣 Repulse Bay	0.0	1.0	26.5	27.5
K04 秀茂坪 Sau Mau Ping	0.0	5.0	27.0	32.0
K06 長沙灣 Cheung Sha Wan	0.0	0.5	30.0	30.5
N06 葵涌 Kwai Chung	0.0	0.0	40.0	40.0
N09 沙田 Sha Tin	0.0	0.5	51.0	51.5
N12 元朗 Yuen Long	0.0	0.0	56.5	56.5
R21 踏石角 Tap Shek Kok	0.0	[0.0]	16.0	[16.0]
R26 石崗 Shek Kong	0.0	[0.0]	52.0	[52.0]
R31 大尾篤 Tai Mei Tuk	0.0	[1.5]	70.0	[71.5]

註： [] 基於不完整的每小時雨量數據。

Note : [] based on incomplete hourly data.

表 3.7.3 錦雯影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮
Table 3.7.3 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of Cam

站 (參閱圖 1.1) Station (see Fig. 1.1)	最高潮位 (海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮 (天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度 (米)	日期/月份	時間	高度 (米)	日期/月份	時間
	Height (m)	Date/Month	Time	Height (m)	Date/Month	Time
鯪魚涌 Quarry Bay	2.75	26/9	10.37 a.m.	0.51	26/9	10.37 a.m.
大埔滘 Tai Po Kau	2.98	26/9	10.57 a.m.	0.73	26/9	10.57 a.m.
橫瀾島 Waglan Island	2.80	26/9	9.54 a.m.	0.46	26/9	9.59 a.m.

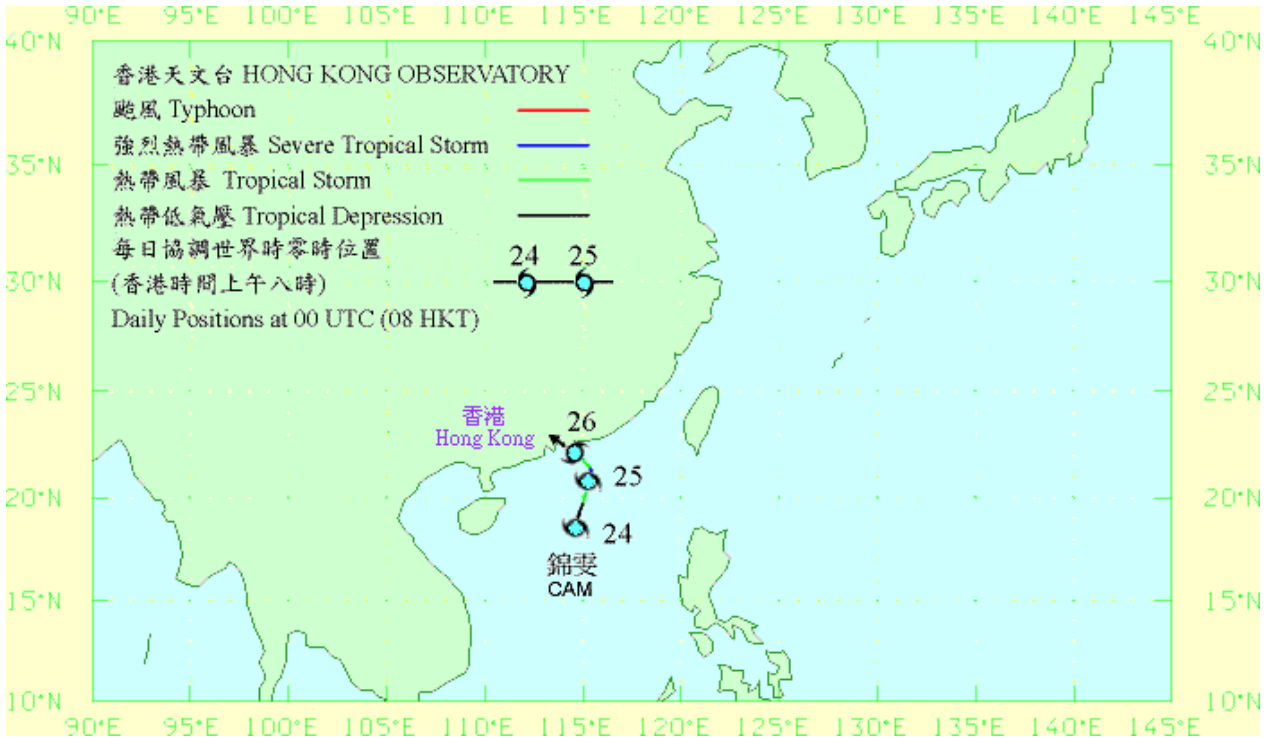


圖 3.7.1.a 一九九九年九月二十四日至二十六日強烈熱帶風暴錦雯 (9919) 的路徑圖。
 Figure 3.7.1.a Track of Severe Tropical Storm Cam (9919) : 24 – 26 September 1999.



圖 3.7.1.b 一九九九年九月二十六日錦雯橫過香港時的路徑圖。
 Figure 3.7.1.b Track of Cam over Hong Kong on 26 September 1999.

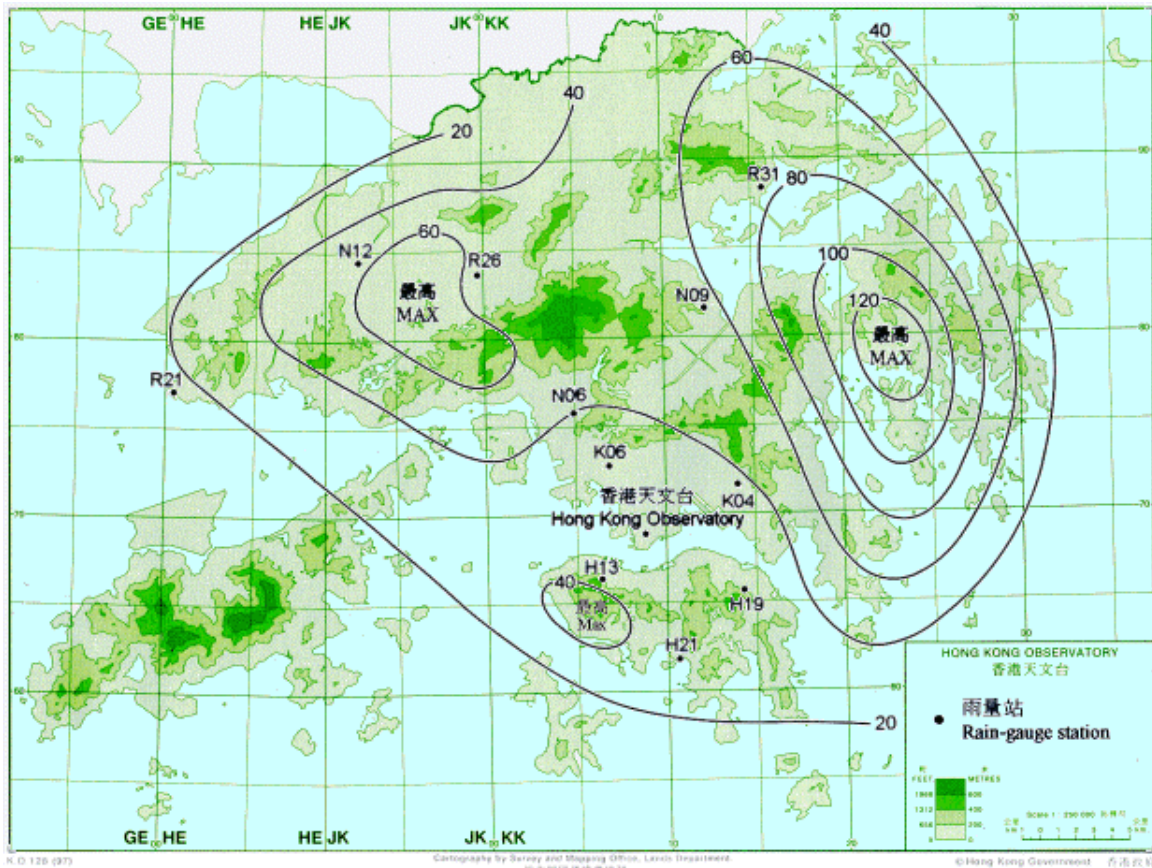


圖 3.7.2 一九九九年九月二十四日至二十六日的雨量分佈圖。
 Figure 3.7.2 Rainfall distribution on 24 – 26 September 1999.

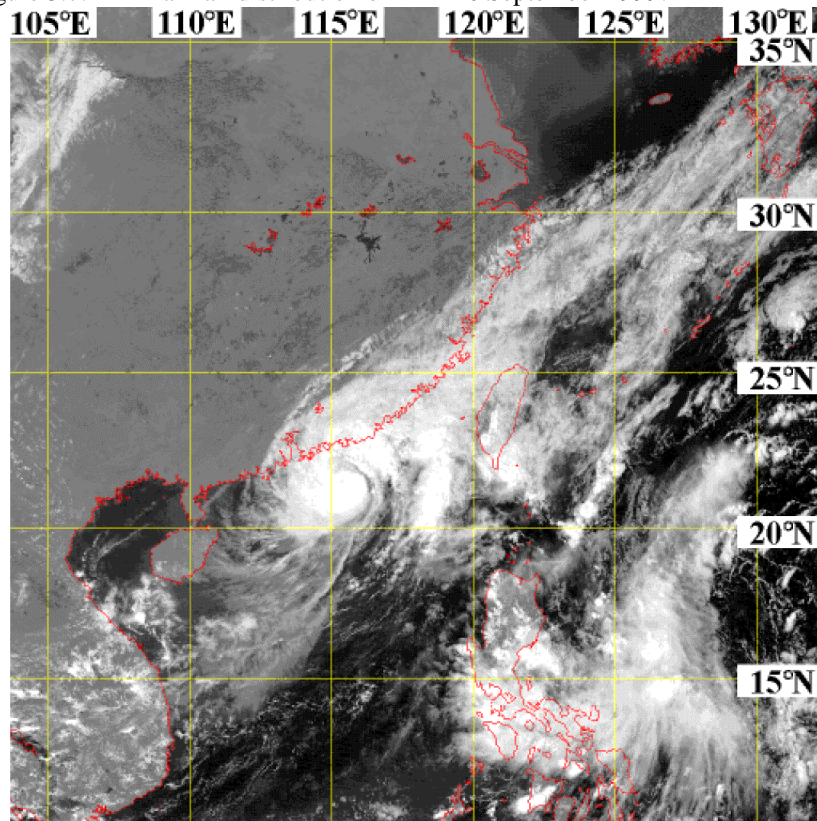


圖 3.7.3.a 一九九九年九月二十五日約下午2時錦雲的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.7.3.a Visible imagery of Cam at around 2 p.m. on 25 September 1999
 (originally captured by GMS-5 of JMA).

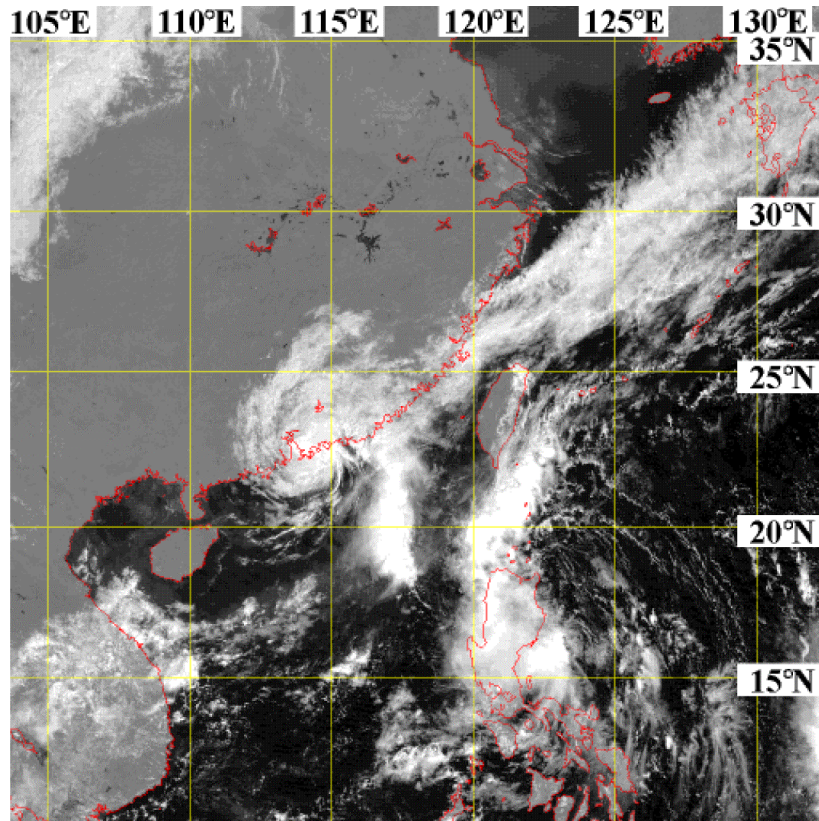


圖 3.7.3.b 一九九九年九月二十六日約上午11時錦雯的可見光衛星圖片
 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。
 Figure 3.7.3.b Visible imagery of Cam at around 11 a.m. on 26 September 1999
 (originally captured by GMS-5 of JMA).

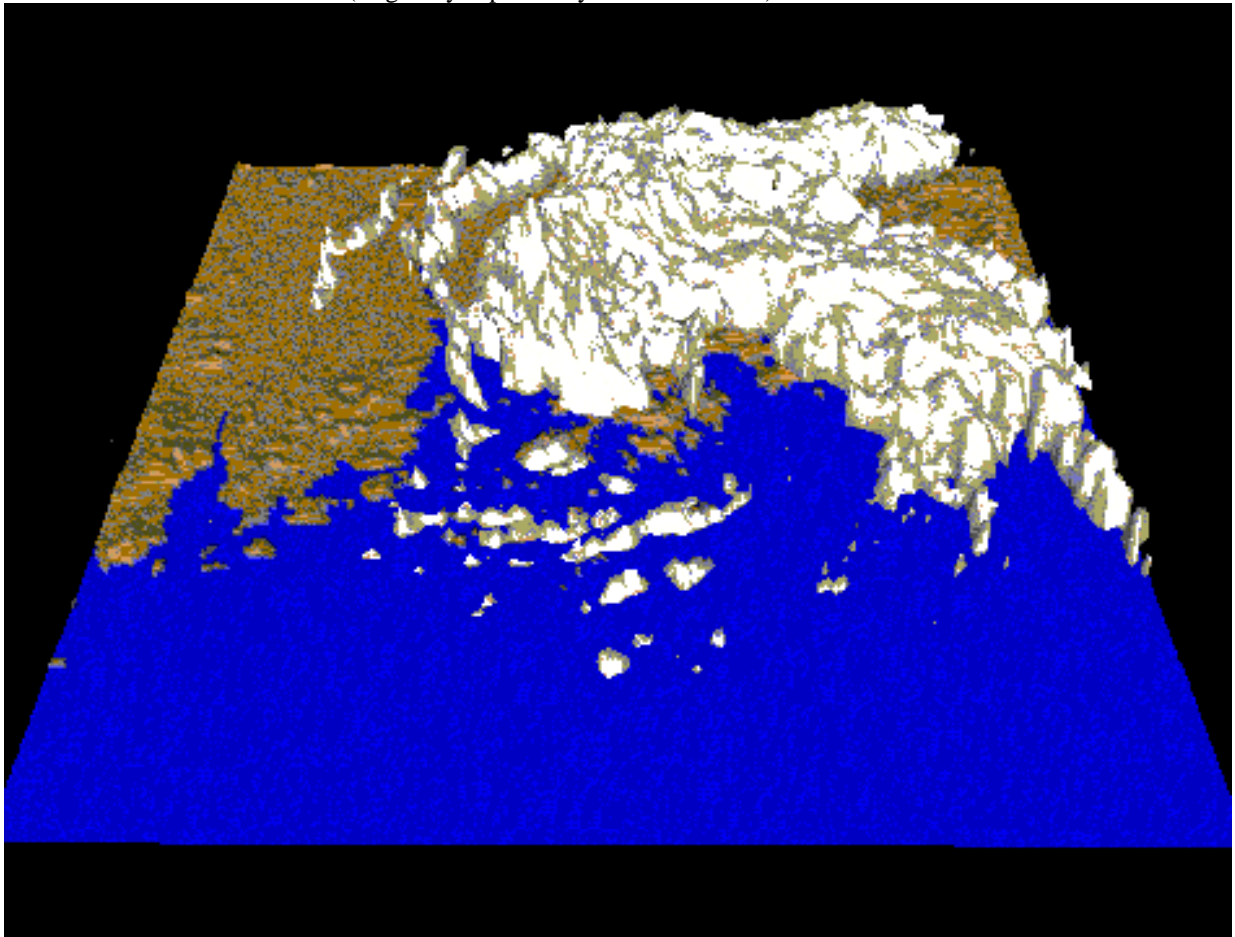


圖 3.7.4 一九九九年九月二十六日上午11時的立體雷達回波圖片。
 Figure 3.7.4 3-D Radar echoes captured at 11 a.m. on 26 September 1999.

3.8

颱風丹尼(9920)
十月三日至十日

丹尼在十月三日清晨於馬尼拉東北偏東約1 140公里處形成爲一熱帶低氣壓。它初時向西北移動，在該晚增強爲一熱帶風暴。丹尼隨後採取偏西途徑移動，在十月四日變爲一強烈熱帶風暴。它繼續增強，在午夜時分達至颱風程度。丹尼在十月五日登陸呂宋北部，當地最少有五人死亡，超過2 600間房屋被水浸，農作物損失約爲200萬美元。

在十月五日晚上，丹尼進入南海。它在翌日移動緩慢，然後在十月七日突轉向北推進，以每小時約10公里的速度趨近福建沿岸。丹尼在十月八日晚上增強，其風眼在衛星雲圖上清晰可見。丹尼在十月九日早上於廈門附近登陸，跟著迅速減弱，並於一日後在福州附近變爲一低壓區。

在登陸廈門之前，丹尼的最高持續風速及最低中心氣壓估計約爲每小時140公里及960百帕斯卡。這強度可與颱風約克比擬——約克是在九月份橫過香港並且導致天文台需要懸掛十號風球的颱風。

丹尼在福建省廈門、泉州及漳州等地肆虐。在丹尼的吹襲下，共有34人死亡及1 400多人受傷，約23 000間房屋被水浸及1 500間屋倒毀，直接經濟損失約爲20億元人民幣。丹尼亦在金門造成嚴重破壞，該島交通全部癱瘓，電力供應亦嚴重受影響。

在本港，一號戒備信號在十月五日下午8時45分懸掛，當時丹尼位於香港東南約750公里處。丹尼的環流較爲廣闊，隨著它的移近，香港偏北風增強而離岸亦轉吹強風，三號強風信號在十月七日上午5時35分懸掛。由於丹尼轉向北移動，趨近福建沿岸，它對香港的威脅相應減低，天文台在下午4時15分改掛一號戒備信號。

香港天文台總部在十月七日下午4時及5時錄得最低每小時海平面氣壓爲1 004.2百帕斯卡。丹尼在十月八日約下午5時最接近香港，當時它位於香港以東約400公里處。由於丹尼開始在廈門附近登陸及本地風勢減弱，所有熱帶氣旋警告信號在十月九日上午9時25分除下。

丹尼影響香港期間，天文台總部祇錄得微量雨量記錄，本港亦沒有嚴重破壞及傷亡的報告。

表3.8.1-3.8.2分別是丹尼影響香港時各站所錄得的最高風速及最高潮汐資料。圖3.8.1-3.8.2分別是丹尼的路徑圖及衛星雲圖。

3.8**Typhoon Dan (9920)
3 - 10 October 1999**

Dan developed into a tropical depression about 1 140 km east-northeast of Manila on the early morning of 3 October. Tracking northwestwards at first, Dan intensified into a tropical storm that night. After taking on a westward course, Dan became a severe tropical storm on 4 October. It continued to intensify and attained typhoon strength at around midnight. Dan made landfall on 5 October over the northern part of Luzon where at least five persons were killed. Over 2 600 houses were inundated. Damage to crops was estimated to be US \$2 million.

Dan entered the South China Sea on the night of 5 October. It slowed down the next day and abruptly turned northwards on 7 October, edging towards the coast of Fujian at a speed of about 10 km/h. Dan strengthened and its eye became well defined on satellite imagery on the night of 8 October. After making landfall near Xiamen on the morning of 9 October, Dan weakened considerably and degenerated into an area of low pressure near Fuzhou the next day.

Just before making landfall near Xiamen, Dan's maximum sustained winds and minimum sea-level pressure near its centre were estimated to be 140 km/h and 960 hPa. This makes Dan comparable in strength to Typhoon York which crossed Hong Kong in September and for which the No. 10 Signal was hoisted.

Dan wreaked havoc in Xiamen, Quanzhou, Zhangzhou in Fujian Province. The toll of casualties attributed to Dan included 34 deaths and 1 400 injuries. About 23 000 houses were inundated and 1 500 houses were destroyed. Direct economic losses were estimated at 2 billion RMB. Dan also unleashed its fury on Jinmen where all traffic was paralysed and electricity supply was seriously disrupted.

In Hong Kong the Standby Signal No. 1 was hoisted at 8.45 p.m. on 5 October when Dan was about 750 km to the southeast. The circulation of Dan was rather extensive and as Dan moved closer, northerly winds in Hong Kong strengthened and became strong offshore. The Strong Wind Signal No. 3 was hoisted at 5.35 a.m. on 7 October. As Dan turned northwards towards the coast of Fujian and thus lessening its threat to Hong Kong, the Standby Signal No. 1 was hoisted to replace the Strong Wind Signal No. 3 at 4.15 p.m.

The lowest hourly sea-level pressure of 1 004.2 hPa was recorded at the Hong Kong Observatory Headquarters at 4 p.m. and 5 p.m. on 7 October. Dan was closest to Hong Kong at around 5 p.m. on 8 October when it was about 400 km to the east. As Dan began to make landfall near Xiamen and local winds subsided, all tropical cyclone warning signals were lowered at 9.25 a.m. on 9 October.

During the passage of Dan, only traces of rainfall were recorded at the Hong Kong Observatory Headquarters. No significant damage was reported in Hong Kong.

Information on wind and tide during the passage of Dan is given in Tables 3.8.1 - 3.8.2. Figures 3.8.1 - 3.8.2 show respectively the track of Dan and satellite imageries.

表 3.8.1 在丹尼影響下，本港各站在熱帶氣旋警告信號懸掛時所錄得的最高陣風、最高每小時平均風速及風向

Table 3.8.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations during the hoisting of the tropical cyclone warning signals for Dan

站 Station	(參閱圖 1.1) (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/小時) Speed (km/h)			風向 Direction	風速(公里/小時) Speed (km/h)		
中環	Central	西北偏西 WNW	40	8/10	0200	西北 NW	20	8/10	0300
赤鱗角 (機場)	Chek Lap Kok (Airport)	西北 NW	52	7/10	0955	西北 NW	23	7/10	1300
長洲	Cheung Chau	北 N	81	8/10	0128	北 N	51	8/10	0300
長沙灣	Cheung Sha Wan	北 N	30	7/10	1534	西 W	9	8/10	1500
京士柏	King's Park	西北偏北 NNW	38	7/10	1454	西 W	16	8/10	1500
平洲	Ping Chau	西北 NW	34	8/10	0526	西北 NW	12	8/10	0500
西貢	Sai Kung	東北偏北 NNE	52	7/10	1237	北 N	34	7/10	1200
沙螺灣	Sha Lo Wan	西北 NW	31	7/10	1040	西南 SW	16	8/10	2200
		西北 NW	31	7/10	1041				
石崗	Shek Kong	西北偏西 WNW	36	7/10	1452	西北偏西 WNW	13	7/10	1300
天星碼頭	Star Ferry	西 W	45	8/10	1553	西北偏西 WNW	27	8/10	0700
打鼓嶺	Ta Kwu Ling	西北偏北 NNW	36	7/10	0438	西北偏北 NNW	16	6/10	0800
大尾篤	Tai Mei Tuk	西北 NW	49	7/10	0944	西北 NW	25	7/10	1000
大帽山	Tai Mo Shan	西北偏西 WNW	70	8/10	1731	西北偏西 WNW	49	8/10	1800
大老山	Tate's Cairn	西北偏北 NNW	65	8/10	1537	西北偏北 NNW	41	8/10	0100
						西北偏北 NNW	41	8/10	0200
鯽魚湖	Tsak Yue Wu	東北 NE	49	7/10	0953	東北 NE	23	7/10	1000
						東北偏北 NNE	23	7/10	1100
青衣	Tsing Yi	西北偏北 NNW	65	8/10	0700	西北偏北 NNW	27	8/10	0800
屯門	Tuen Mun	西北偏北 NNW	41	8/10	1142	東北偏北 NNE	14	6/10	0900
橫瀾島	Waglan Island	北 N	58	7/10	1030	北 N	38	7/10	1100
黃竹坑	Wong Chuk Hang	西北偏北 NNW	36	8/10	0117	西北偏北 NNW	16	7/10	1100
		北 N	36	8/10	1338	西北偏北 NNW	16	8/10	0100
						北 N	16	8/10	0200

表 3.8.2 丹尼影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

Table 3.8.2 Times and heights of the maximum sea level and the maximum storm surge recorded at various tide stations in Hong Kong during the passage of Dan

站(參閱圖 1.1) Station (see Fig. 1.1)	最高潮位(海圖基準面以上) Maximum sea level (above chart datum)			最大風暴潮(天文潮高度以上) Maximum storm surge (above astronomical tide)		
	高度(米)	日期/月份	時間	高度(米)	日期/月份	時間
	Height (m)	Date/Month	Time	Height (m)	Date/Month	Time
鯽魚涌 Quarry Bay	2.61	8/10	8.59 a.m.	0.53	6/10	7.16 p.m.
大埔滘 Tai Po Kau	2.59	8/10	9.26 a.m.	0.56	6/10	8.03 p.m.
橫瀾島 Waglan Island	2.63	6/10	6.58 a.m.	0.50	8/10	9.20 p.m.

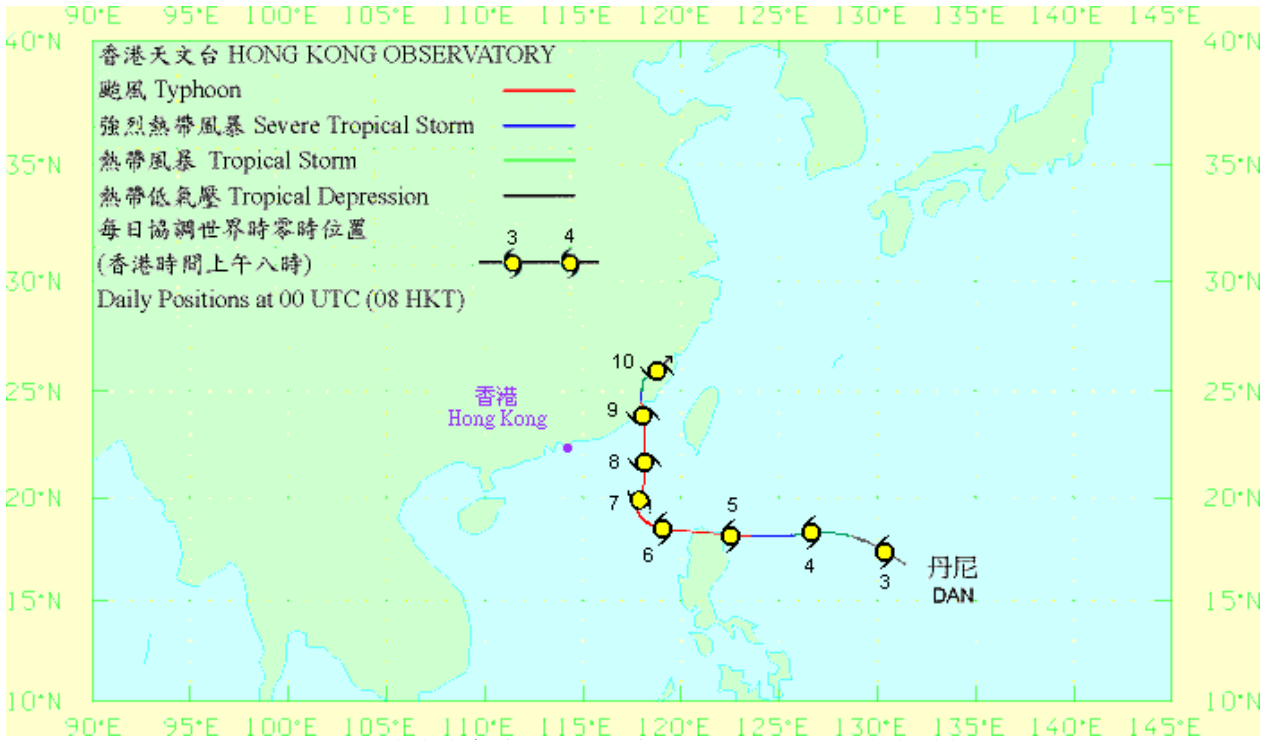


圖 3.8.1 一九九九年十月三日至十日颱風丹尼 (9920) 的路徑圖。

Figure 3.8.1 Track of Typhoon Dan (9920) : 3 – 10 October 1999.

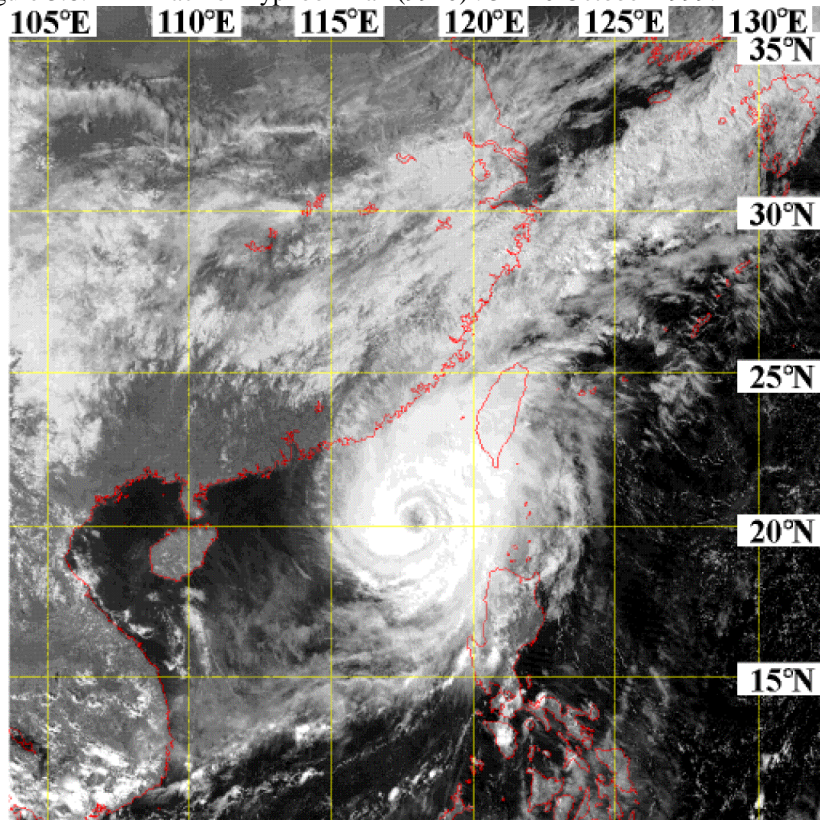


圖 3.8.2.a 一九九九年十月七日約下午2時丹尼的可見光衛星圖片 (此衛星雲圖接收自日本氣象廳的地球同步氣象衛星 (GMS-5))。

Figure 3.8.2.a Visible imagery of Dan at around 2 p.m. on 7 October 1999 (originally captured by GMS-5 of JMA).

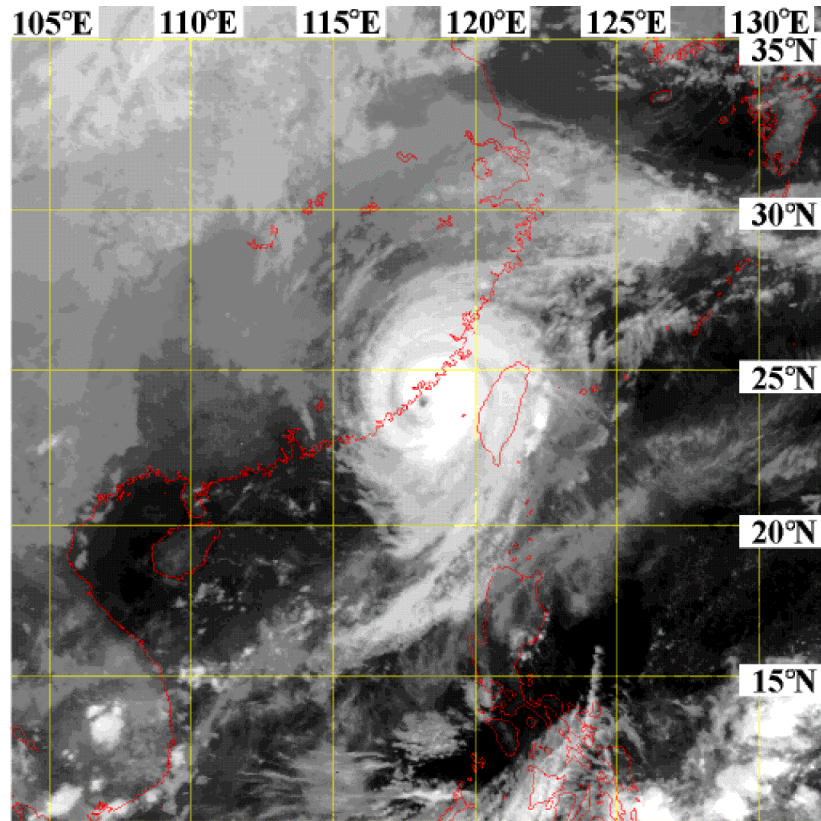


圖 3.8.2.b 一九九九年十月九日約上午8時丹尼的紅外線衛星圖片
(此衛星雲圖接收自日本氣象廳的地球同步氣象衛星(GMS-5))。

Figure 3.8.2.b Infra-red imagery of Dan at around 8 a.m. on 9 October 1999
(originally captured by GMS-5 of JMA).

第四節

熱帶氣旋統計表

Section 4

TROPICAL CYCLONE STATISTICS AND TABLES

表4.1是一九九九年在北太平洋西部及南海區域（即由赤道至北緯45度、東經100度至180度所包括的範圍）的熱帶氣旋一覽。表內所給出的日期只說明某熱帶氣旋在上述範圍內出現的時間，因而不一定包括整個風暴過程。這個限制對表內其他元素亦同樣適用。

表4.2是天文台在一九九九年為船舶發出的熱帶氣旋警告的次數、時段、首個及末個警告發出的時間。當有熱帶氣旋位於香港責任範圍內時（即由北緯10至30度、東經105至125度所包括的範圍），天文台會發出這些警告。表內使用的時間為協調世界時。

表4.3是一九九九年熱帶氣旋警告信號發出的次數及其時段的摘要。表內亦提供每次熱帶氣旋警告信號懸掛或除下的時間和發出警報的次數。表內使用的時間為香港時間。

表4.4是一九五六至一九九九年間熱帶氣旋警告信號發出的次數及其時段的摘要。

表4.5是一九五六至一九九九年間每年位於香港責任範圍內以及每年引致天文台需要懸掛熱帶氣旋警告信號的熱帶氣旋總數。

表4.6是一九五六至一九九九年間天文台懸掛各種熱帶氣旋警告信號的最長、最短及平均時段。

表4.7是一九九九年當熱帶氣旋影響香港時本港的氣象觀測摘要。資料包括熱帶氣旋最接近香港時的位置及時間和當時估計熱帶氣旋中心附近的最低氣壓、京士柏及橫瀾島錄得的最高風速、香港天文台錄得的最低平均海平面氣壓以及香港各潮汐測量站錄得的最大風暴潮（即實際水位高出潮汐表中預計的部分，單位為米）。

表4.8.1是一九九九年位於香港600公里範圍內的熱帶氣旋及其為香港所帶來的雨量。

表4.8.2是一八八四至一九三九年以及一九四七至一九九九年間十個為香港帶來最多雨量的熱帶氣旋和有關的雨量資料。

表4.9是自一九四六年以來，天文台懸掛十號颶風信號時所錄得的氣象資料。內容包括熱帶氣旋吹襲香港時的最近距離及方位、天文台錄得的最低海平面氣壓、香港各站錄得的最高60分鐘平均風速和最高陣風。

表4.10是一九九九年熱帶氣旋在香港所造成的損失。資料參考了各政府部門和公共事業機構所提供的報告及本地報章的報導。

表4.11是一九六零至一九九九年間熱帶氣旋在香港所造成的人命傷亡及破壞。資料參考了各政府部門和公共事業機構所提供的報告及本地報章的報導。

TABLE 4.1 is a list of tropical cyclones in 1999 in the western North Pacific and the South China Sea (i.e. the area bounded by the Equator, 45°N, 100°E and 180°). The dates cited are the residence times of each tropical cyclone within the above-mentioned region and as such might not cover the full life-span. This limitation applies to all other elements in the table.

TABLE 4.2 gives the number of tropical cyclone warnings for shipping issued by the Hong Kong Observatory in 1999, the durations of these warnings and the times of issue of the first and last warnings for all tropical cyclones in Hong Kong's area of responsibility (i.e. the area bounded by 10°N, 30°N, 105°E and 125°E). Times are given in hours and minutes in UTC.

TABLE 4.3 presents a summary of the occasions/durations of the hoisting of tropical cyclone warning signals in 1999. The sequence of the signals displayed and the number of tropical cyclone warning bulletins issued for each tropical cyclone are also given. Times are given in hours and minutes in Hong Kong Time.

TABLE 4.4 presents a summary of the occasions/durations of the hoisting of tropical cyclone warning signals from 1956 to 1999 inclusive.

TABLE 4.5 gives the annual number of tropical cyclones in Hong Kong's area of responsibility between 1956 and 1999 and also the annual number of tropical cyclones necessitated the hoisting of tropical cyclone warning signals in Hong Kong.

TABLE 4.6 shows the maximum, mean and minimum durations of the tropical cyclone warning signals hoisted during the period 1956-1999.

TABLE 4.7 is a summary of meteorological information for each tropical cyclone affecting Hong Kong in 1999. Information on the nearest approach together with an estimate of the minimum central pressure of each tropical cyclone during its closest approach, the maximum winds at King's Park and Waglan Island, the minimum mean sea-level pressure recorded at the Hong Kong Observatory and the maximum storm surge (the excess, in metres, of the actual water level over that predicted in the Tide Tables) recorded at various tide stations in Hong Kong are included.

TABLE 4.8.1 tabulates the amount of rainfall associated with each tropical cyclone that came within 600 km of Hong Kong in 1999.

TABLE 4.8.2 highlights the 10 wettest tropical cyclones in Hong Kong for the period 1884-1939 and 1947-1999.

TABLE 4.9 provides some meteorological information for those typhoons requiring the hoisting of the Hurricane Signal No. 10 in Hong Kong since 1946. The information presented includes the distances and bearings of nearest approach, the minimum mean sea-level pressures recorded at the Hong Kong Observatory and the maximum 60-minute mean winds and maximum gust peak speeds recorded at some stations in Hong Kong.

TABLE 4.10 contains damage caused by tropical cyclones in 1999. The information is based on reports from various government departments, public utility companies and local newspapers.

TABLE 4.11 presents casualties and damage caused by tropical cyclones in Hong Kong : 1960-1999. The information is based on reports from various government departments, public utility companies and local newspapers.

表 4.1 一九九九年北太平洋西部及南海區域的熱帶氣旋一覽

TABLE 4.1 LIST OF TROPICAL CYCLONES IN THE WESTERN NORTH PACIFIC AND THE SOUTH CHINA SEA IN 1999

熱帶氣旋名稱	Name of tropical cyclone	編號 Code	路徑起點 Beginning of track				路徑終點 End of track				DISP: 消散 Dissipated / XT: 變為溫帶氣旋 Became Extratropical
			日期/月份 Date/Month	時間 ⁺ Time ⁺	位置 Position 北緯 °N 東經 °E		日期/月份 Date/Month	時間 ⁺ Time ⁺	位置 Position 北緯 °N 東經 °E		
熱帶低氣壓愛莉絲	Tropical Depression Iris		16 / 2	1800	11.5	131.1	19 / 2	0000	16.1	129.1	DISP
強烈熱帶風暴姬蒂	Severe Tropical Storm Kate	(9901)	22 / 4	1800	13.1	126.1	28 / 4	1800	30.2	151.6	XT
颱風利奧	Typhoon Leo	(9902)	28 / 4	0000	15.8	111.2	2 / 5	1200	22.5	114.8	DISP
颱風瑪姬	Typhoon Maggie	(9903)	1 / 6	1800	11.8	130.4	8 / 6	0600	24.0	111.2	DISP
熱帶低氣壓	Tropical Depression	(9904)	15 / 7	0000	21.8	154.4	18 / 7	0000	28.8	142.3	DISP
熱帶低氣壓	Tropical Depression		21 / 7	0000	28.7	130.0	22 / 7	0600	33.6	127.2	XT
強烈熱帶風暴尼爾	Severe Tropical Storm Neil	(9905)	25 / 7	0000	21.9	127.0	28 / 7	0000	36.9	126.3	DISP
熱帶風暴	Tropical Storm	(9906)	25 / 7	0000	17.9	113.2	27 / 7	1800	25.7	117.9	DISP
颱風奧嘉	Typhoon Olga	(9907)	29 / 7	0000	12.2	135.2	3 / 8	1800	39.8	126.9	DISP
熱帶風暴保羅	Tropical Storm Paul	(9908)	3 / 8	1200	20.1	139.7	7 / 8	1200	33.3	125.1	DISP
熱帶低氣壓慧卓茹	Tropical Depression Rachel	(9909)	5 / 8	1800	20.9	116.0	8 / 8	0000	25.8	126.6	DISP
颱風森姆	Typhoon Sam	(9910)	19 / 8	0000	16.2	127.1	23 / 8	1200	24.2	113.0	DISP
熱帶風暴戴娜	Tropical Storm Dora	(9911)	20 / 8	0000	18.0	179.3	22 / 8	1800	24.9	168.8	DISP
強烈熱帶風暴泰妮亞	Severe Tropical Storm Tanya	(9912)	20 / 8	0000	29.9	176.2	23 / 8	1200	37.6	157.8	DISP
熱帶風暴維賽爾	Tropical Storm Virgil	(9913)	24 / 8	1800	25.4	141.0	28 / 8	0000	29.5	147.2	DISP
熱帶風暴芸蒂	Tropical Storm Wendy	(9914)	1 / 9	0600	13.0	126.9	4 / 9	0000	23.9	116.1	DISP
颱風約克	Typhoon York	(9915)	12 / 9	0000	17.3	123.8	17 / 9	0000	23.9	112.4	DISP
熱帶風暴思雅	Tropical Storm Zia	(9916)	13 / 9	0600	27.3	134.1	15 / 9	0600	35.7	136.7	DISP
熱帶風暴安茵	Tropical Storm Ann	(9917)	15 / 9	1800	28.3	129.3	19 / 9	0000	32.5	122.0	DISP
颱風伯特	Typhoon Bart	(9918)	18 / 9	1800	21.7	128.8	24 / 9	1200	39.9	136.9	XT
強烈熱帶風暴錦雯	Severe Tropical Storm Cam	(9919)	24 / 9	0000	18.6	114.6	26 / 9	0600	22.5	113.8	DISP
颱風丹尼	Typhoon Dan	(9920)	2 / 10	1800	16.8	131.4	10 / 10	0000	26.0	118.8	DISP
熱帶風暴伊芙	Tropical Storm Eve	(9921)	17 / 10	0600	15.6	119.4	20 / 10	0000	17.4	106.6	DISP
熱帶低氣壓法蘭基	Tropical Depression Frankie		7 / 11	0600	10.2	129.5	10 / 11	0000	13.6	125.4	DISP
強烈熱帶風暴姬羅莉亞	Severe Tropical Storm Gloria	(9922)	13 / 11	1200	16.0	131.3	16 / 11	0600	32.7	146.9	XT
熱帶低氣壓	Tropical Depression		14 / 12	0600	10.7	113.7	16 / 12	0000	12.0	109.7	DISP

+ 時間為協調世界時

+ Times are given in UTC

表 4.2 一九九九年為船舶發出的熱帶氣旋警告

TABLE 4.2 TROPICAL CYCLONE WARNINGS FOR SHIPPING ISSUED IN 1999

熱帶氣旋	Tropical cyclone	發出警告 的次數 No. of warnings issued	發出的日期及時間				警告的 時段 (小時) Duration of warnings (hours)
			Date and time of issue of				
			首次警告		末次警告		
First warning		Last warning					
日期/月份 時間 ⁺		日期/月份 時間 ⁺					
Date/Month Time ⁺		Date/Month Time ⁺					
* 颱風利奧	* Typhoon Leo	38	28 / 4	0000	2 / 5	1200	108
* 颱風瑪姬	* Typhoon Maggie	30	4 / 6	2100	8 / 6	0600	81
* 熱帶風暴	* Tropical Storm	18	25 / 7	0300	27 / 7	0600	51
熱帶低氣壓慧卓茹	Tropical Depression Rachel	15	6 / 8	0600	7 / 8	2100	39
* 颱風森姆	* Typhoon Sam	33	19 / 8	1200	23 / 8	1200	96
* 熱帶風暴芸蒂	* Tropical Storm Wendy	20	2 / 9	0000	4 / 9	0300	51
* 颱風約克	* Typhoon York	40	12 / 9	0000	16 / 9	1800	114
* 強烈熱帶風暴錦雯	* Severe Tropical Storm Cam	22	24 / 9	0000	26 / 9	0900	57
* 颱風丹尼	* Typhoon Dan	46	4 /10	1200	10 /10	0000	132
熱帶風暴伊芙	Tropical Storm Eve	26	17 /10	0600	20 /10	0600	72
熱帶低氣壓法蘭基	Tropical Depression Frankie	15	8 /11	0600	10 /11	0000	42
熱帶低氣壓	Tropical Depression	13	14 /12	1200	16 /12	0000	36
	共 Total	316					879

* 這些熱帶氣旋皆引致天文台需要懸掛熱帶氣旋警告信號。

* Tropical cyclones for which tropical cyclone warning signals were hoisted in Hong Kong.

⁺ 時間為協調世界時。

⁺ Times are given in UTC.

表 4.3 一九九九年天文台所懸掛的熱帶氣旋警告信號及警報發出的次數
 TABLE 4.3 TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG AND NUMBER OF WARNING BULLETINS ISSUED IN 1999

摘要 SUMMARY

信號 Signal	次數 No. of occasions	總時段 Total duration	
		時 h	分 min
1	10	299	40
3	13	163	15
8 西北 NW	4	18	0
8 西南 SW	3	14	55
8 東北 NE	2	8	45
8 東南 SE	-	-	-
9	2	4	25
10	1	11	0
共 Total	35	520	0

詳情 DETAILS

熱帶氣旋 Tropical cyclone	警報發出的次數 No. of warning bulletins issued	信號 Signal	懸掛 Hoisted		除下 Lowered	
			日期/月份 Date/Month	時間* Time*	日期/月份 Date/Month	時間* Time*
颱風利奧 Typhoon Leo	98	1	29 / 4	0940	30 / 4	1615
		3	30 / 4	1615	2 / 5	1330
		8 NE	2 / 5	1330	2 / 5	1730
		3	2 / 5	1730	2 / 5	2045
颱風瑪姬 Typhoon Maggie	69	1	5 / 6	2345	6 / 6	1415
		3	6 / 6	1415	7 / 6	0030
		8 NW	7 / 6	0030	7 / 6	0245
		9	7 / 6	0245	7 / 6	0545
		8 NE	7 / 6	0545	7 / 6	1030
		3	7 / 6	1030	7 / 6	1445
		1	7 / 6	2230	8 / 6	0045
3	8 / 6	0045	8 / 6	1345		
熱帶風暴 Tropical Storm	51	1	25 / 7	1145	26 / 7	2245
		3	26 / 7	2245	27 / 7	1345
颱風森姆 Typhoon Sam	82	1	20 / 8	1615	22 / 8	0230
		3	22 / 8	0230	22 / 8	1230
		8 NW	22 / 8	1230	22 / 8	2010
		8 SW	22 / 8	2010	23 / 8	0350
3	23 / 8	0350	23 / 8	2100		
熱帶風暴芸蒂 Tropical Storm Wendy	33	1	3 / 9	0345	4 / 9	1120
颱風約克 Typhoon York	91	1	13 / 9	1045	15 / 9	1015
		3	15 / 9	1015	16 / 9	0315
		8 NW	16 / 9	0315	16 / 9	0520
		9	16 / 9	0520	16 / 9	0645
		10	16 / 9	0645	16 / 9	1745
		8 SW	16 / 9	1745	16 / 9	2210
3	16 / 9	2210	17 / 9	0045		
強烈熱帶風暴錦雯 Severe Tropical Storm Cam	61	1	24 / 9	0940	25 / 9	1540
		3	25 / 9	1540	26 / 9	0520
		8 NW	26 / 9	0520	26 / 9	1120
		8 SW	26 / 9	1120	26 / 9	1410
		3	26 / 9	1410	26 / 9	1520
颱風丹尼 Typhoon Dan	89	1	5 / 10	2045	7 / 10	0535
		3	7 / 10	0535	7 / 10	1615
		1	7 / 10	1615	9 / 10	0925

* 香港時間 (協調世界時加八小時)

* Hong Kong Time (UTC + 8 hours)

表 4.4 一九五六至一九九九年間每年各熱帶氣旋警告信號的懸掛次數及總時段
 TABLE 4.4 FREQUENCY AND TOTAL DURATION OF DISPLAY OF TROPICAL CYCLONE
 WARNING SIGNALS : 1956-1999

年份 Year	信號 Signals								總時段 Total duration	
	1	3	8 西北 NW	8 西南 SW	8 東北 NE	8 東南 SE	9	10	時 h	分 min
1956	5	4	0	0	0	0	0	0	191	25
1957	4	9	1	1	2	2	0	1	295	45
1958	4	5	0	0	1	0	0	0	214	5
1959	1	1	0	0	0	0	0	0	36	35
1960	11	7	0	2	2	2	1	1	432	35
1961	6	7	1	2	1	0	1	1	192	55
1962	4	3	0	1	1	0	1	1	158	10
1963	4	5	0	0	1	0	0	0	175	50
1964	11	14	1	3	5	3	3	2	570	15
1965	7	6	0	0	1	1	0	0	239	40
1966	6	5	0	0	2	2	0	0	284	40
1967	8	6	0	0	2	1	0	0	339	10
1968	7	7	0	1	1	0	1	1	290	10
1969	4	2	0	0	0	0	0	0	110	15
1970	6	8	2	1	2	0	0	0	286	45
1971	9	10	1	3	2	2	1	1	323	25
1972	8	6	0	0	1	1	0	0	288	20
1973	8	6	1	1	1	0	1	0	416	50
1974	12	10	0	0	2	1	1	0	525	20
1975	8	6	1	0	0	1	1	1	292	20
1976	6	6	0	0	1	2	0	0	351	30
1977	8	6	0	0	1	0	0	0	395	10
1978	8	9	1	1	3	2	0	0	462	10
1979	5	5	1	0	2	2	1	1	281	15
1980	10	8	0	0	1	1	0	0	414	5
1981	5	4	0	0	1	1	0	0	202	20
1982	7	4	0	0	0	0	0	0	247	35
1983	8	7	0	1	2	2	1	1	289	42
1984	6	6	0	0	1	0	0	0	280	2
1985	5	4	1	0	0	1	0	0	193	35
1986	6	7	0	1	1	0	0	0	305	0
1987	6	1	0	0	0	0	0	0	165	45
1988	6	4	0	0	0	0	0	0	204	10
1989	7	8	0	0	2	2	0	0	306	10
1990	6	4	0	0	0	0	0	0	245	10
1991	8	6	0	0	1	1	0	0	349	55
1992	5	5	0	0	1	1	0	0	167	5
1993	8	9	0	0	2	4	0	0	325	40
1994	4	3	0	0	0	0	0	0	138	10
1995	8	6	2	2	1	1	0	0	348	50
1996	7	2	0	0	0	1	0	0	189	0
1997	2	3	0	1	1	0	1	0	97	30
1998	5	2	0	0	0	0	0	0	188	35
1999	10	13	4	3	2	0	2	1	520	0
共 Total	289	259	17	24	50	37	16	12	12332	54
平均 Mean	6.6	5.9	0.4	0.5	1.1	0.8	0.4	0.3	280	18

表 4.5 一九五六至一九九九年間每年位於香港責任範圍內以及每年引致天文台需要懸掛熱帶氣旋警告信號的熱帶氣旋總數

TABLE 4.5 ANNUAL NUMBER OF TROPICAL CYCLONES IN HONG KONG'S AREA OF RESPONSIBILITY AND THE NUMBER THAT NECESSITATED THE DISPLAY OF TROPICAL CYCLONE WARNING SIGNALS IN HONG KONG : 1956-1999

年份 Year	每年位於香港責任範圍內的熱帶氣旋總數 Annual number of tropical cyclones in Hong Kong's area of responsibility	每年引致天文台需要懸掛熱帶氣旋警告信號的熱帶氣旋總數 Annual number of tropical cyclones necessitating the display of signals in Hong Kong
1956	23	5
1957	12	6
1958	15	5
1959	18	2
1960	18	9
1961	24	6
1962	20	4
1963	13	4
1964	26	10
1965	16	6
1966	17	6
1967	17	8
1968	12	6
1969	11	4
1970	21	6
1971	20	9
1972	15	5
1973	17	9
1974	21	11
1975	12	7
1976	10	5
1977	10	8
1978	20	8
1979	18	6
1980	17	10
1981	15	5
1982	16	5
1983	15	7
1984	14	5
1985	15	5
1986	16	4
1987	12	5
1988	17	6
1989	17	7
1990	18	6
1991	14	6
1992	11	5
1993	14	9
1994	20	4
1995	17	8
1996	15	7
1997	10	2
1998	15	5
1999	12	8
共 Total	706	274
平均 Mean	16.0	6.2

表 4.6 一九五六至一九九九年間天文台懸掛熱帶氣旋警告信號的時段

TABLE 4.6 DURATION OF TROPICAL CYCLONE WARNING SIGNALS HOISTED IN HONG KONG: 1956-1999

信號 Signal	次數 Number of occasions	每次時段 Duration of each occasion			每年總時段 Total duration per year								
		平均 Mean		最長 Maximum		最短 Minimum							
		時 h	分 min	時 h	分 min	時 h	分 min						
一號或以上 1 or higher	285	43	16	161	0	9	35	280	18	570	15	36	35
三號或以上 3 or higher	195	30	52	124	15	6	55	136	48	306	35	17	15
八號或以上 8 or higher	66	15	36	66	50	2	40	23	24	100	55	0	0
8 西北 NW	17	6	1	15	45	1	30	2	20	18	0	0	0
8 西南 SW	24	5	7	10	45	2	30	2	47	16	10	0	0
8 東北 NE	50	8	14	35	35	2	35	9	21	40	20	0	0
8 東南 SE	37	7	17	21	45	0	20	6	7	31	15	0	0
九號或以上 9 or higher	17	7	19	12	25	3	0	2	50	19	25	0	0
10	12	6	34	11	0	2	30	1	47	12	10	0	0

表 4.7 一九九九年當熱帶氣旋影響香港時本港的氣象觀測摘要

TABLE 4.7 A SUMMARY OF METEOROLOGICAL OBSERVATIONS RECORDED IN HONG KONG DURING THE PASSAGES OF TROPICAL CYCLONES IN 1999

熱帶氣旋 名稱 Name of tropical cyclone	當最接近香港時 Nearest approach to Hong Kong							香港天文台錄得的最低每小時 平均海平面氣壓 (百帕斯卡) Minimum hourly M.S.L. pressure at the Hong Kong Observatory				最大風暴潮 (米) Maximum storm surge (metres)				
	月份 Month	日期 Date	時間* Hour*	方位 Direction	距離 (公里) Distance (km)	移動方向 及速度 (公里每小時) Movement (km/h)	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	月份 Month	日期 Date	時間* Hour*	氣壓 (百帕斯卡) Pressure (hPa)	樂安排 Lok On Pai	鰂魚涌 Quarry Bay	大埔滘 Tai Po Kau	尖鼻咀 Tsim Bei Tsui	橫瀾島 Waglan Island
颱風利奧 T. Leo	5	2	17	東南偏東 ESE	45	北 N 15	998	5	2	17	1004.7	0.66	0.74	0.89	0.68	-
颱風瑪姬 T. Maggie	6	7	4	西北 NW	5	西南 SW 30	975	6	7	4	981.2	0.54	0.69	-	0.63	0.63
熱帶風暴 T. S.	7	27	4	東南 SE	120	東北 NE 25	985	7	26	17	993.2	-	0.46	0.50	-	-
颱風森姆 T. Sam	8	22	18	東北 NE	25	西北 NW 25	975	8	22	16	982.6	-	0.60	0.90	0.79	0.70
熱帶風暴芸蒂 T. S. Wendy	9	4	5	東北偏東 ENE	230	北 N 30	996	9	4	5	1002.8	-	0.29	0.19	-	0.18
颱風約克 T. York	9	16	10	西南偏南 SSW	20	西北偏西 WNW 10	970	9	16	9	976.8	-	0.74	-	-	0.73
強烈熱帶風暴錦雯 S. T. S. Cam	9	26	11	東北偏北 NNE	10	西北 NW 25	998	9	26	11	1005.2	-	0.51	0.73	-	0.46
颱風丹尼 T. Dan	10	8	17	東 E	400	北 N 7	965	10	7	16,17	1004.2	-	0.53	0.56	-	0.50

* 香港時間 (協調世界時加八小時)

* Hong Kong Time (UTC + 8 hours)

表 4.7 (續)
TABLE 4.7 (cont'd)

熱帶氣旋 名稱 Name of tropical cyclone	月份 Month	最高60分鐘平均風向及風速 (公里每小時) Maximum 60-min mean wind in points and km/h		最高10分鐘平均風向及風速 (公里每小時) Maximum 10-min mean wind in points and km/h		最高陣風風向及風速 (公里每小時) Maximum gust peak speed in km/h with direction in points	
		京士柏 King's Park	橫瀾島 Waglan Island	京士柏 King's Park	橫瀾島 Waglan Island	京士柏 King's Park	橫瀾島 Waglan Island
颱風利奧 T. Leo	4 - 5	東北偏北 NNE 27	東北偏北 NNE 94	東北偏北 NNE 31	東北偏北 NNE 96	東北偏北 NNE 67	東北偏北 NNE 130
颱風瑪姬 T. Maggie	6	東 E 31	東南偏南 SSE 72	東 E 36	東南偏南 SSE 76	東南偏南, 東南 SSE, SE 68	西 W 92
熱帶風暴 T. S.	7	東 E 23	東北 NE 72	東北偏北 NNE 31	東北 NE 77	東北偏北 NNE 59	東北 NE 92
颱風森姆 T. Sam	8	北 N 47	西南偏西 WSW 99	北 N 52	西南偏西 WSW 108	西北偏北, 南 NNW, S 101	北 N 148
熱帶風暴芸蒂 T. S. Wendy	9	西 W 12	西北偏西 WNW 20	北, 西 N, W 13	西北偏西 WNW 22	西南偏西 WSW 25	東 E 31
颱風約克 T. York	9	北 N 68	東北偏北 NNE 153	東北偏北 NNE 81	東北偏北 NNE 169	東北偏北 NNE 149	東北偏北 NNE 234
強烈熱帶風暴錦雯 S. T. S. Cam	9	西北偏北, 西北 NNW, NW 31	西北偏北 NNW 72	西北偏北 NNW 38	西 W 79	西北 NW 72	西北偏北 NNW 104
颱風丹尼 T. Dan	10	西北偏北 NNW 19	北 N 40	西北偏北 NNW 22	北 N 43	西北偏北 NNW 38	北 N 58

表 4.8.1 一九九九年位於香港600公里範圍內的熱帶氣旋及其為本港帶來的雨量
 TABLE 4.8.1 RAINFALL ASSOCIATED WITH EACH TROPICAL CYCLONE THAT CAME WITHIN 600 KM OF HONG KONG IN 1999

熱帶氣旋名稱 Name of tropical cyclone	熱帶氣旋位於香港600公里範圍內的時期 Period when tropical cyclone within 600 km of Hong Kong (T ₁ → T ₂) 日期/月份 時間* Date/Month Time*	香港天文台錄得的雨量(毫米) Rainfall at the Hong Kong Observatory (mm)				
		(i) 在香港600公里內 within 600 km of Hong Kong (T ₁ → T ₂)	(ii) 在 T ₂ 之後 的24小時內 24-hour period after T ₂	(iii) 在 T ₂ 之後 的48小時內 48-hour period after T ₂	(iv) 在 T ₂ 之後 的72小時內 72-hour period after T ₂	(i) + (iv) 共 Total T ₁ → (T ₂ +72 小時 hours)
颱風利奧 T. Leo	(T ₁) 29 / 4 0900 - (T ₂) 2 / 5 2000	72.3	0.1	0.1	27.9	100.2
颱風瑪姬 T. Maggie	(T ₁) 6 / 6 0700 - (T ₂) 8 / 6 1400	76.8	7.0	7.9	7.9	84.7
熱帶風暴 Tropical Storm	(T ₁) 25 / 7 0800 - (T ₂) 28 / 7 0200	31.0	微量 Trace	微量 Trace	微量 Trace	31.0
熱帶低氣壓慧卓茹 # T.D. Rachel	(T ₁) 6 / 8 0200 - (T ₂) 7 / 8 1300	微量 Trace	3.3	22.5	54.3	54.3
颱風森姆 T. Sam	(T ₁) 21 / 8 0600 - (T ₂) 23 / 8 2000	368.1	178.9	248.1	248.4	616.5
熱帶風暴芸蒂 T.S. Wendy	(T ₁) 3 / 9 0900 - (T ₂) 4 / 9 0800	微量 Trace	微量 Trace	3.8	3.8	3.8
颱風約克 T. York	(T ₁) 13 / 9 1500 - (T ₂) 17 / 9 0800	282.8	1.4	1.4	16.8	299.6
強烈熱帶風暴錦雯 S.T.S. Cam	(T ₁) 24 / 9 0800 - (T ₂) 26 / 9 1400	24.5	5.8	16.5	16.5	41.0
颱風丹尼 T. Dan	(T ₁) 6 / 10 1400 - (T ₂) 10 / 10 0500	微量 Trace	-	-	0.1	0.1
熱帶風暴伊芙 # T.S. Eve	(T ₁) 18 / 10 0600 - (T ₂) 18 / 10 2000	微量 Trace	微量 Trace	微量 Trace	微量 Trace	微量 Trace
					共 Total :	1231.2

* 香港時間 (協調世界時加八小時)

T₁ - 熱帶氣旋首次出現於香港600公里範圍內的時間。

T₂ - 熱帶氣旋在香港600公里範圍內消散或離開該範圍的時間。

該熱帶氣旋並未導致天文台需要懸掛熱帶氣旋警告信號。

* Hong Kong Time (UTC + 8 hours)

T₁ - The time when a tropical cyclone was first centred within 600 km of Hong Kong.

T₂ - The time when a tropical cyclone was dissipated within or moved outside 600 km of Hong Kong.

Tropical cyclone without hoisting of tropical cyclone warning signal in Hong Kong.

表 4.8.2 一八八四至一九三九年及一九四七至一九九九年間十個為香港帶來最多雨量的熱帶氣旋
TABLE 4.8.2 TEN WETTEST TROPICAL CYCLONES IN HONG KONG (1884-1939, 1947-1999)

熱帶氣旋 Tropical Cyclone			香港天文台錄得的雨量(毫米) Rainfall at the Hong Kong Observatory (mm)				
年份 Year	月份 Month	名稱 Name	(i) 在香港600公里內 within 600 km of Hong Kong (T ₁ →T ₂)	(ii) 在 T ₂ 之後的 24 小時內 24-hour period after T ₂	(iii) 在 T ₂ 之後的 48 小時內 48-hour period after T ₂	(iv) 在 T ₂ 之後的 72 小時內 72-hour period after T ₂	(i) + (iv) 共 Total T ₁ → (T ₂ +72 小時 hours)
1999	8	森姆 Sam	368.1	178.9	248.1	248.4	616.5
1926	7	-	34.8 #	534.0 #	561.1 #	562.2 #	597.0
1916	6	-	494.8 #	27.9 #	59.4 #	67.2 #	562.0
1965	9	愛娜斯 Agnes	404.6	8.9	64.3	126.1	530.7
1978	7	愛娜斯 Agnes	502.4	12.3	12.3	16.6	519.0
1976	8	愛倫 Ellen	90.7	394.2	421.0	425.4	516.1
1993	9	黛蒂 Dot	459.6	37.9	37.9	37.9	497.5
1982	8	黛蒂 Dot	41.2	322.5	403.1	450.5	491.7
1995	8	海倫 Helen	241.4	146.2	235.2	239.5	480.9
1904	8	-	446.5 #	- #	3.7 #	26.7 #	473.2

T₁ - 熱帶氣旋首次出現於香港600公里範圍內的時間。

T₂ - 熱帶氣旋在香港600公里範圍內消散或離開該範圍的時間。

對於一九六一年以前的熱帶氣旋，欄(i)顯示當它位於香港600公里範圍內的日子裡，天文台所錄得的總日雨量，欄(ii)至(iv)分別是指其後一至三天累積的日雨量。

T₁ - The time when a tropical cyclone was first centred within 600 km of Hong Kong.

T₂ - The time when a tropical cyclone was dissipated within or moved outside 600 km of Hong Kong.

For years prior to 1961, column (i) is the sum of daily rainfall on those days when a tropical cyclone was centred within 600 km of Hong Kong, columns (ii) to (iv) show respectively the accumulated daily rainfall on the following one to three days.

表 4.9 一九四六至一九九九年間引致天文台需要懸掛十號颶風信號的颱風

TABLE 4.9 TYPHOONS REQUIRING THE HOISTING OF THE HURRICANE SIGNAL NO. 10 DURING THE PERIOD 1946-1999

颱風名稱 Name of typhoon	當最接近天文台時 Nearest approach to the Hong Kong Observatory		最低平均海平面氣壓 (百帕斯卡) Minimum M.S.L. pressure (hPa)		最高60分鐘平均風向及風速 (公里每小時) Maximum 60-min mean wind in points and km/h							最高陣風風向及風速 (公里每小時) Maximum gust peak speed in km/h with direction in points						
	日期/月份 年份 Date/Month Year	(公里) (km)	每小時 Hourly	瞬時 Inst.	香港天文台 Hong Kong Observatory	京士柏 King's Park	啓德機場 Kai Tak Airport	橫瀾島 Waglan Island	長洲 Cheung Chau	大老山 Tate's Cairn	青洲 Green Island	香港天文台 Hong Kong Observatory	京士柏 King's Park	啓德機場 Kai Tak Airport	橫瀾島 Waglan Island	長洲 Cheung Chau	大老山 Tate's Cairn	青洲 Green Island
-	18 / 7 1946	南 S 70	985.7	-	東北 NE -	-	-	-	-	-	-	-	-	-	-	-	-	-
姬羅莉亞 Gloria	22 / 9 1957	西南 SW 55	986.2	984.3	東南偏東 ESE 115	-	東南偏東 ESE 72	東 E 113	-	-	-	東 E 187	-	東北偏東 ENE 158	東北偏東 ENE 185	-	-	-
瑪麗 Mary	9 / 6 1960	西北偏西 WNW 10	974.3	973.8	東南偏南 SSE 96	-	東南偏南 SSE 92	西南偏南 SSW 112	-	-	-	東南偏南 SSE 191	-	東南 SE 164	西南偏南 SSW 194	-	-	-
愛麗斯 Alice	19 / 5 1961	0	981.6	981.1	東北偏東 ENE 83	-	東 E 70	東南偏東 ESE 90	東北偏東 ENE 76	-	-	東 E 166	-	東北偏東 ENE 139	西南 SW 128	東北偏東 ENE 135	-	-
溫黛 Wanda	1 / 9 1962	西南偏南 SSW 20	955.1	953.2	北 N 133	-	北 N 108	西北 NW 148	西北 NW 118	東南 SE 189	-	北 N 259	-	北 N 229	西北偏北 NNW 216	西北 NW 232	東南偏東 ESE 284	-
露比 Ruby	5 / 9 1964	西南 SW 30	971.0	968.2	東 E 110	-	北 N 118	東北偏東 ENE 148	東北 NE 113	東南偏東 ESE 167	-	東北偏北 NNE 227	-	西北 NW 203	東 E 230	東北偏北 NNE 216	東 E 268	-
黛蒂 Dot	13 / 10 1964	東 E 35	978.9	977.3	西北偏北 NNW 88	-	北 N 67	北 N 117	西北偏北 NNW 96	東北偏北 NNE 157	-	北 N 175	-	北 N 198	北 N 184	西北偏西 WNW 205	東北 NE 220	-
雪麗 Shirley	21 / 8 1968	0	968.7	968.6	北 N 68	-	北 N 75	東北偏北 NNE 124	西南偏南 SSW 90	東北偏北 NNE 126	-	北 N 133	-	北 N 151	東北 NE 209	西南偏南 SSW 167	東北偏北 NNE 203	-
露絲 Rose	17 / 8 1971	西南偏西 WSW 20	984.5	982.8	東南 SE 103	-	東南 SE 122	東南偏東 ESE 140	東南 SE 131	南 S 148	-	東南偏東 ESE 224	-	東南偏東 ESE 211	東南偏東 ESE 189	東南 SE 194	南 S 221	-
愛茜 Elsie	14 / 10 1975	南 S 50	996.4	996.2	東北偏東 ENE 58	北 N 75	西北偏北 NNW 67	東北偏北 NNE 118	北 N 106	東北 NE 130	西北偏北 NNW 118	東北 NE 140	北 N 137	北 N 140	東北偏東 ENE 176	東北 NE 158	東北偏北 NNE 180	東北 NE 167
荷貝 Hope	2 / 8 1979	西北偏北 NNW 10	961.8	961.6	西 W 75	西北偏西 WNW 79	西 W 115	西南 SW 144	西南偏南 SSW 117	西北 NW 115	西 W 108	西 W 175	西北偏西 WNW 166	西北偏西 WNW 182	西南 SW 198	西南偏西 WSW 185	西北偏西 WNW 229	西 W 167
愛倫 Ellen	9 / 9 1983	西南 SW 45	983.9	983.1	東 E 92	東 E 88	東 E 112	東南偏東 ESE 169	東南偏東 ESE 171	東 E 126	南 S 137	東 E 185	東 E 167	東 E 203	東 E 227	東南偏南 SSE 238	東北偏東 ENE 218	南 S 220*
約克 York	16 / 9 1999	西南偏南 SSW 20	976.8	976.1	東 E 63	北 N 68	東北偏北 NNE 59	東北偏北 NNE 153	東北偏北 NNE 113	-	-	東 E 137	東北偏北 NNE 149	東北偏東 ENE 142	東北偏北 NNE 234	東北 NE 182	-	-

* 估計，超出風速記錄圖的上限。
estimated, exceeding upper limit of anemogram.

表 4.10 一九九九年熱帶氣旋在香港所造成的損失

TABLE 4.10 DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG IN 1999

熱帶氣旋名稱 Name of tropical cyclone	月份 Month	物質損毀 Damage in physical terms					金錢損失 (百萬港元) Damage in monetary terms (million HK\$)					
		農業 Agriculture	公用建設 Public works facilities	公用業務 Public utilities	物業單位 Property	山泥傾瀉及 斜坡倒塌 Landslip and collapse of slope	農業 Agriculture	公用建設 Public works facilities	公用業務 Public utilities	私人物業 Private property	其他 Others	共 Total
颱風利奧 T. Leo	4 - 5	-	道路road: 1 處site	電力供應 electric supply: 1 663 用戶 families	-	3 宗cases	-	-	-	-	-	-
颱風瑪姬 T. Maggie	6	農地farmland: 7 公頃hectares	道路road: 1 處site	電力供應 electric supply: 9 053 用戶 families	-	2 宗cases	0.16	0.62	-	-	-	0.78
熱帶風暴 T.S.	7	-	-	電力供應 electric supply: 499 用戶 families	-	-	-	-	-	-	-	-
颱風森姆 T. Sam	8	農地farmland: 320 公頃 hectares 果園 fruit plants: 1 公頃hectare 塘魚 pond fish: 148 噸tons	道路road: 46 處sites 水利設施 irrigation facilities: 4 處sites	電力供應 electric supply: 40 589 用戶 families 食水供應 water supply: 1 處site	22 個units	163 宗cases	81.12	50.39	-	-	-	131.51

表 4.10 (續)
TABLE 4.10 (cont'd)

熱帶氣旋名稱 Name of tropical cyclone	月份 Month	物質損毀 Damage in physical terms					金錢損失 (百萬港元) Damage in monetary terms (million HK\$)					
		農業 Agriculture	公用建設 Public works facilities	公用業務 Public utilities	物業單位 Property	山泥傾瀉及 斜坡倒塌 Landslip and collapse of slope	農業 Agriculture	公用建設 Public works facilities	公用業務 Public utilities	私人物業 Private property	其他 Others	共 Total
熱帶風暴芸蒂 T.S. Wendy	9	-	-	電力供應 electric supply: 1 601 用戶families	-	1 宗case	-	-	-	-	-	-
颱風約克 T. York	9	農地farmland: 340 公頃 hectares 果園 fruit plants: 6 公頃hectares 塘魚 pond fish: 266 噸tons	道路road: 8 處sites	電力供應 electric supply: 80 106 用戶families 食水供應 water supply: 2 處sites 電訊系統 telecommunication: 9 條電路circuits 公共巴士public bus: 5 架vehicles	17 個units	39 宗cases	74.10	8.50	0.08	0.08	-	82.76
強烈熱帶風暴錦雯 S.T.S. Cam	9	-	道路road: 1 處site	電力供應 electric supply: 4 650 用戶families	-	5 宗cases	-	0.94	-	-	-	0.94
颱風丹尼 T. Dan	10	-	-	電力供應 electric supply: 2 058 用戶families	-	-	-	-	-	-	-	-

備註：資料由各有關政府部門及公共事業機構提供，同時亦參考了本地報章上的損毀報導。

N.B.: Based on information supplied by relevant government departments and public utility companies. Damage reports in the local press were also examined and collated.

表 4.11 一九六零至一九九九年間熱帶氣旋在香港所造成的人命傷亡及破壞
TABLE 4.11 CASUALTIES AND DAMAGE CAUSED BY TROPICAL CYCLONES IN HONG KONG : 1960-1999

年份 Year	日期 / 月份 Date / Month	Name of tropical cyclone	熱帶氣旋 名稱	死亡人數 Persons dead	失蹤人數 Persons missing	受傷人數 Persons injured	遇事越洋 船舶 Ocean-going vessels in trouble	受到毀壞 或翻沉的 小艇數目 Small craft sunk or wrecked	受到損壞 的小艇 數目 Small craft damaged
1960	4 / 6 - 12 / 6	T. Mary	瑪麗	45	11	127	6	352	462
1961	17 / 5 - 21 / 5	T. Alice	愛麗斯	4	0	20	*	*	*
	7 / 9 - 10 / 9	S.T.S. Olga	奧嘉	7	0	0	0	1	0
1962	28 / 8 - 2 / 9	T. Wanda	溫黛	130	53	*	36	1 297	756
1963	1 / 9 - 9 / 9	T. Faye	菲爾	3	0	51	0	2	0
1964	26 / 5 - 28 / 5	T. Viola	維奧娜	0	0	41	5	18	18
	2 / 8 - 9 / 8	T. Ida	艾黛	5	4	56	3	7	60
	2 / 9 - 6 / 9	T. Ruby	露比	38	6	300	20	32	282
	4 / 9 - 10 / 9	T. Sally	莎莉	9	0	24	0	0	0
	7 / 10 - 13 / 10	T. Dot	黛蒂	26	10	85	2	31	59
1965	6 / 7 - 16 / 7	T. Freda	法妮黛	2	0	16	0	1	0
	25 / 9 - 28 / 9	T.S. Agnes	愛娜斯	5	0	3	0	0	0
1966	12 / 7 - 14 / 7	S.T.S. Lola	露娜	1	0	6	0	*	6
1967	19 / 8 - 22 / 8	S.T.S. Kate	姬蒂	0	0	3	3	1	0
1968	17 / 8 - 22 / 8	T. Shirley	雪麗	0	0	4	1	*	3
1969	22 / 7 - 29 / 7	T. Viola	維奧娜	0	0	0	0	3	0
1970	1 / 8 - 3 / 8	T.D. -	-	2 ⁺	0	0	0	0	0
	8 / 9 - 14 / 9	T. Georgia	喬治亞	0	0	0	2	0	*
1971	15 / 6 - 18 / 6	T. Freda	法妮黛	2	0	30	8	0	0
	16 / 7 - 22 / 7	T. Lucy	露茜	0	0	38	10	2	13
	10 / 8 - 17 / 8	T. Rose	露絲	110	5	286	33	303	*
1972	4 / 11 - 9 / 11	T. Pamela	柏美娜	1	0	8	3	0	0
1973	14 / 7 - 20 / 7	T. Dot	黛蒂	1	0	38	14	*	*
1974	7 / 6 - 14 / 6	T. Dinah	戴娜	0	0	0	1	*	*
	18 / 7 - 22 / 7	T. Ivy	艾菲	0	0	0	2	*	*
	15 / 10 - 19 / 10	T. Carmen	嘉曼	1	0	0	5	*	*
	21 / 10 - 27 / 10	T. Della	黛娜	0	0	0	2	*	*
1975	10 / 8 - 14 / 8	T.D. -	-	2	1	0	3	1	*
	9 / 10 - 14 / 10	T. Elsie	愛茜	0	0	46	7	2	1
	16 / 10 - 23 / 10	S.T.S. Flossie	霍蘿茜	0	0	0	1	*	*
1976	22 / 6 - 4 / 7	T. Ruby	露比	3	2	2	0	0	0
	21 / 7 - 26 / 7	S.T.S. Violet	維奧莉	2	1	1	0	0	0
	5 / 8 - 6 / 8	S.T.S. Clara	嘉麗	0	0	4	0	0	0
	21 / 8 - 24 / 8	T.S. Ellen	愛倫	27	3	65	0	4	7
	15 / 9 - 21 / 9	T. Iris	愛莉斯	0	0	27	6	0	1
1977	4 / 7 - 6 / 7	T.D. -	-	0	0	2	0	0	0
	3 / 9 - 5 / 9	T.S. Carla	嘉娜	0	0	1	1	0	0
	22 / 9 - 25 / 9	S.T.S. Freda	法妮黛	1	0	37	2	0	0
1978	24 / 7 - 30 / 7	S.T.S. Agnes	愛娜斯	3	0	134	0	25	42
	9 / 8 - 12 / 8	T.S. Bonnie	邦妮	0	0	0	2	0	0
	23 / 8 - 28 / 8	S.T.S. Elaine	伊蘭	1	0	51	8	5	8
	22 / 9 - 26 / 9	S.T.S. Kit	吉蒂	0	7	0	0	1	0
	7 / 10 - 16 / 10	S.T.S. Nina	蓮娜	0	0	2	0	0	0
	17 / 10 - 29 / 10	T. Rita	麗姐	0	0	3	1	5	0

表 4.11 (續)
TABLE 4.11 (cont'd)

年份 Year	日期 / 月份 Date / Month	Name of tropical cyclone	熱帶氣旋 名稱	死亡人數 Persons dead	失蹤人數 Persons missing	受傷人數 Persons injured	遇事越洋 船舶 Ocean-going vessels in trouble	受到毀壞 或翻沉的 小艇數目 Small craft sunk or wrecked	受到損壞 的小艇 數目 Small craft damaged
1979	1 / 7 - 6 / 7	T. Ellis	艾利斯	0	0	0	0	2	0
	26 / 7 - 30 / 7	T.S. Gordon	戈登	0	0	0	0	2	0
	28 / 7 - 3 / 8	T. Hope	荷貝	12	0	260	29	167	207
	6 / 8 - 9 / 8	T.D. -	-	0	0	0	0	3	0
	16 / 9 - 24 / 9	S.T.S. Mac	麥克	1	0	67	2	12	0
1980	5 / 7 - 12 / 7	S.T.S. Ida	艾黛	0	0	0	1	0	0
	18 / 7 - 23 / 7	T. Joe	喬伊	2	1	59	4	0	1
	20 / 7 - 28 / 7	T. Kim	甘茵	0	0	0	0	2	1
	29 / 10 - 2 / 11	T.S. Cary	卡里	0	0	0	0	0	2
1981	3 / 7 - 7 / 7	S.T.S. Lynn	林茵	0	0	32	0	0	3
1982	27 / 6 - 2 / 7	T.S. Tess	戴絲	0	0	16	0	1	0
	22 / 7 - 30 / 7	T. Andy	安迪	0	0	0	0	0	1
	5 / 9 - 16 / 9	T. Irving	伊文	0	0	0	0	0	2
1983	12 / 7 - 19 / 7	T. Vera	維娜	0	0	0	0	1	0
	29 / 8 - 9 / 9	T. Ellen	愛倫	10	12	333	44	135	225
	10 / 10 - 14 / 10	T. Joe	喬伊	0	0	58	2	0	3
	20 / 10 - 26 / 10	S.T.S. Lex	力士	0	0	0	0	0	1
1984	27 / 8 - 7 / 9	T. Ike	艾克	0	0	1	0	0	0
1985	19 / 6 - 25 / 6	T. Hal	哈爾	0	1	13	0	4	2
	1 / 9 - 7 / 9	T. Tess	戴絲	2	0	12	6	1	3
	13 / 10 - 22 / 10	T. Dot	黛蒂	0	0	1	0	0	0
1986	3 / 7 - 12 / 7	T. Peggy	蓓姬	1	0	26	3	0	3
	9 / 8 - 12 / 8	T.D. -	-	0	0	3	0	1	5
	18 / 8 - 6 / 9	T. Wayne	韋恩	3	1	15 ⁺	0	3	0
	11 / 10 - 19 / 10	T. Ellen	愛倫	0	0	4	1	2	1
1987	16 / 10 - 27 / 10	T. Lynn	林茵	0	0	1	0	0	0
1988	14 / 7 - 20 / 7	T. Warren	華倫	0	1	12	1	2	1
	19 / 9 - 22 / 9	T. Kit	吉蒂	0	0	0	0	0	1
	18 / 10 - 23 / 10	T. Pat	帕特	2	0	1	0	0	0
	21 / 10 - 29 / 10	T. Ruby	露比	0	0	4	0	0	0
1989	16 / 5 - 21 / 5	T. Brenda	布倫達	6	1	119	0	3	5
	11 / 7 - 19 / 7	T. Gordon	戈登	2	0	31	1	0	8
	8 / 10 - 14 / 10	T. Dan	丹尼	0	0	0	1	0	1
1990	15 / 5 - 19 / 5	T. Marian	瑪麗安	0	0	0	0	0	1
	15 / 6 - 19 / 6	S.T.S. Nathan	彌敦	5	1	1	1	0	2
	21 / 6 - 30 / 6	T. Percy	珀西	1	0	0	0	0	0
	27 / 7 - 31 / 7	S.T.S. Tasha	泰莎	0	0	1	0	1	0
	25 / 8 - 30 / 8	T. Becky	貝姬	0	1	0	0	0	0
	10 / 9 - 20 / 9	T. Ed	義德	0	0	1	0	0	0
1991	15 / 7 - 20 / 7	T. Amy	艾美	0	0	1	1	0	2
	20 / 7 - 24 / 7	S.T.S. Brendan	布倫登	0	0	17	1	1	13
	13 / 8 - 18 / 8	T. Fred	法雷德	0	0	0	0	1	0
1992	9 / 7 - 14 / 7	T. Eli	艾里	0	0	23	0	0	1
	17 / 7 - 18 / 7	T.S. Faye	菲爾	2	0	24	1	0	3
	19 / 7 - 23 / 7	S.T.S. Gary	加里	0	0	18	2	0	0

表 4.11 (續)
TABLE 4.11 (cont'd)

年份 Year	日期 / 月份 Date / Month	Name of tropical cyclone	熱帶氣旋 名稱	死亡人數 Persons dead	失蹤人數 Persons missing	受傷人數 Persons injured	遇事越洋 船舶 Ocean-going vessels in trouble	受到毀壞 或翻沉的 小艇數目 Small craft sunk or wrecked	受到損壞 的小艇 數目 Small craft damaged
1993	21 / 6 - 28 / 6	T. Koryn	高蓮	0	0	183	0	0	2
	16 / 8 - 21 / 8	T. Tasha	泰莎	0	0	35	0	0	7
	9 / 9 - 14 / 9	T. Abe	艾貝	1	0	0	0	0	0
	15 / 9 - 17 / 9	S.T.S. Becky	貝姬	1	0	130	0	0	10
	23 / 9 - 27 / 9	T. Dot	黛蒂	0	1	48	0	1	0
	28 / 10 - 5 / 11	T. Ira	艾拉	2	0	30	0	1	0
1994	23 / 6 - 25 / 6	T.S. Sharon	莎朗	0	0	5	0	1	1
	25 / 8 - 29 / 8	S.T.S. Harry	夏里	1	0	2	0	0	2
1995	7 / 8 - 12 / 8	S.T.S. Helen	海倫	3	0	35	0	0	0
	25 / 8 - 1 / 9	T. Kent	肯特	0	0	5	0	0	0
	28 / 9 - 4 / 10	T. Sibyl	斯寶	0	0	14	0	0	0
1996	5 / 9 - 10 / 9	T. Sally	莎莉	2	0	4	0	0	0
	18 / 9 - 23 / 9	S.T.S. Willie	威利	0	1	0	0	0	0
1997	31 / 7 - 3 / 8	T. Victor	維克托	1	0	58	0	0	0
	20 / 8 - 23 / 8	T. Zita	思蒂	0	0	3	0	0	0
1998	7 / 8 - 11 / 8	S.T.S. Penny	彭妮	1	0	1	0	0	0
	12 / 9 - 14 / 9	T.D. -	-	0	0	10	0	0	0
	15 / 10 - 27 / 10	T. Babs	寶絲	0	0	14	0	0	0
1999	28 / 4 - 2 / 5	T. Leo	利奧	0	0	14	0	0	0
	2 / 6 - 8 / 6	T. Maggie	瑪姬	0	0	5	0	2	0
	25 / 7 - 28 / 7	T.S. -	-	0	0	18	0	0	0
	19 / 8 - 23 / 8	T. Sam	森姆	4	0	328	0	0	0
	12 / 9 - 17 / 9	T. York	約克	2	0	500	3	*	*
	24 / 9 - 26 / 9	S.T.S. Cam	錦雯	1	0	23	0	0	0

備註：資料由各有關政府部門及公共事業機構提供，同時亦參考了本地報章上的損毀報導。

N.B.: Based on information supplied by relevant government departments and public utility companies. Damage reports in the local press were also examined and collated.

* 缺乏數據 Data unavailable.

+ 被雷電擊中 Struck by lightning.

第五節

一九九九年熱帶氣旋的位置及強度數據

Section 5

**TROPICAL CYCLONE POSITION AND
INTENSITY DATA, 1999**

以下是一九九九年位於北太平洋西部及南海區域（即由赤道至北緯45度、東經100度至180度所包括的範圍）的熱帶氣旋。其每六小時之位置及強度刊於本節。

熱帶氣旋名稱	頁
熱帶低氣壓愛莉絲	120
強烈熱帶風暴姬蒂(9901)	121
颱風利奧(9902)	122
颱風瑪姬(9903)	123
熱帶低氣壓(9904)由七月十五日至十八日	124
熱帶低氣壓由七月二十一日至二十二日	125
強烈熱帶風暴尼爾(9905)	126
熱帶風暴(9906)由七月二十五日至二十八日	127
颱風奧嘉(9907)	128
熱帶風暴保羅(9908)	129
熱帶低氣壓慧卓茹(9909)	130
颱風森姆(9910)	131
熱帶風暴戴娜(9911)	132
強烈熱帶風暴泰妮亞(9912)	133
熱帶風暴維賽爾(9913)	134
熱帶風暴芸蒂(9914)	135
颱風約克(9915)	136
熱帶風暴思雅(9916)	137
熱帶風暴安茵(9917)	138
颱風巴特(9918)	139
強烈熱帶風暴錦雯(9919)	140
颱風丹尼(9920)	141
熱帶風暴伊芙(9921)	142
熱帶低氣壓法蘭基	143
強烈熱帶風暴姬羅莉亞(9922)	144
熱帶低氣壓由十二月十四日至十六日	145

在本節，風速均取10分鐘內的平均值，單位為米每秒（1米每秒約為2海里或4公里每小時）。熱帶氣旋的強度分為：-

- (a) T.D.: - 熱帶低氣壓
- (b) T.S.: - 熱帶風暴
- (c) S.T.S.: - 強烈熱帶風暴
- (d) T.: - 颱風

Six-hourly position and intensity data are tabulated in this section for the following tropical cyclones in 1999 over the western North Pacific and the South China Sea (i.e. the area bounded by the Equator, 45°N, 100°E and 180°).

Name of tropical cyclone	Page
Tropical Depression Iris	120
Severe Tropical Storm Kate (9901)	121
Typhoon Leo (9902)	122
Typhoon Maggie (9903)	123
Tropical Depression (9904) of 15 - 18 July	124
Tropical Depression of 21 - 22 July	125
Severe Tropical Storm Neil (9905)	126
Tropical Storm (9906) of 25 - 28 July	127
Typhoon Olga (9907)	128
Tropical Storm Paul (9908)	129
Tropical Depression Rachel (9909)	130
Typhoon Sam (9910)	131
Tropical Storm Dora (9911)	132
Severe Tropical Storm Tanya (9912)	133
Tropical Storm Virgil (9913)	134
Tropical Storm Wendy (9914)	135
Typhoon York (9915)	136
Tropical Storm Zia (9916)	137
Tropical Storm Ann (9917)	138
Typhoon Bart (9918)	139
Severe Tropical Storm Cam (9919)	140
Typhoon Dan (9920)	141
Tropical Storm Eve (9921)	142
Tropical Depression Frankie	143
Severe Tropical Storm Gloria (9922)	144
Tropical Depression of 14 - 16 December	145

In this section, surface winds refer to wind speeds averaged over a period of 10 minutes given in the unit of m/s (1 m/s is about 2 knots or 4 km/h). Intensities of tropical cyclones are classified as follows:-

- (a) T.D. : - tropical depression
- (b) T.S. : - tropical storm
- (c) S.T.S. : - severe tropical storm
- (d) T. : - typhoon

熱帶低氣壓愛莉絲的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL DEPRESSION IRIS**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
二月 Feb	16	1800	T.D.	1004	13	11.5	131.1	
		17	T.D.	1002	16	11.7	130.5	
	17	0600	T.D.	1002	16	11.9	129.9	
		1200	T.D.	1002	16	12.1	129.4	
		1800	T.D.	1004	13	12.5	128.9	
		18	0000	T.D.	1004	13	13.0	128.4
		0600	T.D.	1004	13	13.6	128.0	
	18	1200	T.D.	1004	13	14.2	127.9	
		1800	T.D.	1004	13	15.1	128.2	
		19	0000	T.D.	1004	13	16.1	129.1

消散
Dissipated

強烈熱帶風暴姬蒂(9901)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 SEVERE TROPICAL STORM KATE (9901)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
四月 Apr	22	1800	T.D.	1000	16	13.1	126.1	
		23	T.D.	1000	16	13.5	126.4	
	23	0600	T.D.	1000	16	13.8	126.8	
		1200	T.D.	1000	16	14.1	127.4	
		1800	T.D.	1000	16	14.4	128.0	
		24	0000	T.D.	1000	16	14.7	128.6
			0600	T.D.	1000	16	15.0	129.1
			1200	T.S.	996	18	15.4	129.6
	24	1800	T.S.	992	21	15.9	130.1	
		25	0000	T.S.	990	23	16.5	130.6
			0600	T.S.	990	23	17.3	131.1
	1200		S.T.S.	985	25	18.2	131.6	
	25	1800	S.T.S.	985	25	19.0	132.2	
		26	0000	S.T.S.	985	25	19.8	132.9
			0600	S.T.S.	985	25	20.5	133.8
	1200		S.T.S.	985	25	21.3	135.0	
	26	1800	S.T.S.	985	25	22.1	136.5	
		27	0000	S.T.S.	985	25	23.1	138.2
			0600	S.T.S.	985	25	24.1	140.0
	1200		S.T.S.	985	25	25.1	141.8	
	27	1800	S.T.S.	985	25	26.1	143.7	
		28	0000	T.S.	990	23	27.1	145.5
			0600	T.S.	990	23	28.2	147.4
	1200		T.S.	990	23	29.2	149.4	
		1800	T.S.	990	23	30.2	151.6	

變為溫帶氣旋
 Became Extratropical

颱風利奧(9902)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON LEO (9902)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
四月 Apr	28	0000	T.D.	1000	16	15.8	111.2
		0600	T.S.	996	18	16.0	111.6
		1200	T.S.	996	18	16.2	112.0
		1800	T.S.	996	18	16.5	112.4
	29	0000	T.S.	992	21	16.9	112.9
		0600	T.S.	990	23	17.3	113.3
		1200	S.T.S.	985	25	17.7	113.7
		1800	S.T.S.	980	28	18.1	114.1
	30	0000	T.	975	33	18.5	114.5
		0600	T.	970	36	19.0	114.9
		1200	T.	970	36	19.5	115.2
		1800	T.	970	36	19.9	115.4
五月 May	1	0000	T.	975	33	20.3	115.5
		0600	S.T.S.	980	31	20.7	115.5
		1200	S.T.S.	985	28	20.9	115.3
		1800	S.T.S.	990	25	21.0	115.1
	2	0000	T.S.	994	23	21.2	114.9
		0600	T.S.	996	21	21.8	114.6
		1200	T.D.	1000	16	22.5	114.8

消散
Dissipated

颱風瑪姬(9903)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON MAGGIE (9903)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
六月 Jun	1	1800	T.D.	1000	16	11.8	130.4	
		2	0000	T.S.	998	18	12.3	130.0
	0600		T.S.	998	18	12.8	129.8	
	1200		T.S.	994	21	13.4	129.6	
	1800		T.S.	994	21	14.0	129.4	
	3		0000	T.S.	994	21	14.7	129.3
		0600	T.S.	990	23	15.4	129.0	
		1200	S.T.S.	985	25	16.0	128.5	
	4	1800	S.T.S.	980	28	16.6	127.8	
		4	0000	S.T.S.	975	31	17.0	127.1
			0600	T.	970	33	17.3	126.5
	1200		T.	970	33	17.7	125.9	
	1800		T.	970	33	18.2	125.2	
	5	0000	T.	965	36	18.8	124.5	
		0600	T.	965	36	19.6	123.7	
		1200	T.	960	39	20.3	122.6	
		1800	T.	960	39	21.0	121.2	
	6	0000	T.	965	36	21.7	119.7	
		0600	T.	965	36	22.5	118.2	
		1200	T.	965	36	22.7	116.5	
		1800	T.	970	33	22.6	114.7	
	7	(2100)	S.T.S.	975	31	22.2	114.0)	
		0000	S.T.S.	980	28	22.0	113.4	
		0600	T.S.	985	21	21.4	112.6	
1200		T.S.	985	23	21.6	113.0		
1800		T.S.	985	23	22.1	112.8		
8	0000	T.S.	990	21	23.2	112.2		
	0600	T.D.	995	16	24.0	111.2		

消散
Dissipated

熱帶低氣壓(9904)由七月十五日至十八日的每六小時之位置及強度

**SIX-HOURLY POSITION AND INTENSITY DATA OF
THE TROPICAL DEPRESSION (9904) OF 15 - 18 JULY**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
七月 Jul	15	0000	T.D.	1002	13	21.8	154.4
		0600	T.D.	1002	13	22.0	153.2
		1200	T.D.	1000	16	22.5	152.1
		1800	T.D.	1000	16	23.0	151.0
	16	0000	T.D.	1000	16	23.7	149.9
		0600	T.D.	1000	16	24.4	148.8
		1200	T.D.	1000	16	25.1	147.7
		1800	T.D.	1000	16	25.8	146.7
	17	0000	T.D.	1000	16	26.4	145.8
		0600	T.D.	1000	16	27.0	145.0
		1200	T.D.	1000	16	27.6	144.1
		1800	T.D.	1000	16	28.2	143.2
	18	0000	T.D.	1000	16	28.8	142.3

消散
Dissipated

熱帶低氣壓由七月二十一日至二十二日的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 THE TROPICAL DEPRESSION OF 21 - 22 JULY**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
七月 Jul	21	0000	T.D.	998	16	28.7	130.0
		0600	T.D.	998	16	29.3	129.4
		1200	T.D.	998	16	30.0	128.8
		1800	T.D.	998	16	31.0	128.0
	22	0000	T.D.	998	16	32.3	127.4
		0600	T.D.	998	16	33.6	127.2

變為溫帶氣旋
 Became Extratropical

強烈熱帶風暴尼爾(9905)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 SEVERE TROPICAL STORM NEIL (9905)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
七月 Jul	25	0000	T.D.	992	16	21.9	127.0
		0600	T.D.	992	16	23.5	127.6
		1200	T.S.	988	21	24.9	128.2
		1800	T.S.	985	23	26.4	128.8
	26	0000	S.T.S.	980	28	28.0	129.2
		0600	S.T.S.	980	28	29.5	129.1
		1200	S.T.S.	980	28	31.0	128.6
		1800	S.T.S.	980	28	32.4	127.9
	27	0000	S.T.S.	980	28	33.5	127.1
		0600	S.T.S.	980	28	34.1	126.5
		1200	T.S.	985	23	34.9	126.0
		1800	T.S.	990	21	35.9	126.0
	28	0000	T.D.	994	16	36.9	126.3

消散
Dissipated

熱帶風暴(9906)由七月二十五日至二十八日的每六小時之位置及強度

**SIX-HOURLY POSITION AND INTENSITY DATA OF
THE TROPICAL STORM (9906) OF 25 - 28 JULY**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
七月 Jul	25	0000	T.D.	994	12	17.9	113.2
		0600	T.D.	992	13	18.2	113.3
		1200	T.D.	992	13	18.5	113.4
		1800	T.D.	992	13	18.8	113.5
	26	0000	T.D.	990	16	19.1	113.6
		0600	T.S.	988	18	19.5	113.7
		1200	T.S.	985	21	20.3	114.1
		1800	T.S.	985	21	21.3	114.8
	27	0000	T.S.	985	21	22.3	115.6
		0600	T.D.	990	16	23.2	116.5
		1200	T.D.	992	13	24.3	117.3
		1800	T.D.	994	13	25.7	117.9

消散
Dissipated

颱風奧嘉(9907)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON OLGA (9907)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
七月 Jul	29	0000	T.D.	1000	13	12.2	135.2
		0600	T.D.	1000	13	13.5	134.8
		1200	T.D.	1000	13	14.7	134.4
		1800	T.D.	998	16	16.0	134.0
	30	0000	T.S.	996	18	17.3	133.5
		0600	T.S.	994	21	18.6	133.0
		1200	T.S.	990	23	19.9	132.5
		1800	S.T.S.	985	25	20.9	132.0
	31	0000	S.T.S.	985	25	21.8	131.5
		0600	S.T.S.	985	25	22.6	131.0
		1200	S.T.S.	980	28	23.3	130.6
		1800	S.T.S.	980	28	24.1	130.0
八月 Aug	1	0000	S.T.S.	975	31	24.8	129.4
		0600	T.	970	33	25.6	128.7
		1200	T.	970	33	26.4	128.1
		1800	T.	970	33	27.1	127.6
	2	0000	T.	970	33	27.9	127.0
		0600	T.	970	33	28.7	126.5
		1200	T.	970	33	30.0	126.0
		1800	T.	970	33	31.5	125.9
	3	0000	T.	970	33	33.3	125.9
		0600	S.T.S.	980	28	35.2	125.9
		1200	T.S.	985	23	37.4	126.1
		1800	T.D.	992	16	39.8	126.9

消散
Dissipated

熱帶風暴保羅(9908)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM PAUL (9908)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
八月 Aug	3	1200	T.D.	1000	16	20.1	139.7
		1800	T.D.	1000	16	21.3	138.6
	4	0000	T.D.	1000	16	22.5	137.5
		0600	T.S.	994	18	23.7	136.4
		1200	T.S.	994	18	24.8	135.3
	5	1800	T.S.	990	21	25.8	134.2
		0000	T.S.	985	23	26.4	133.4
		0600	T.S.	985	23	27.0	132.8
	6	1200	T.S.	990	21	27.6	133.1
		1800	T.S.	990	21	28.2	133.6
		0000	T.S.	990	21	28.9	133.7
		0600	T.S.	990	21	30.0	133.0
		1200	T.S.	990	21	30.8	131.8
		1800	T.S.	990	21	31.5	130.2
	7	0000	T.S.	990	21	32.1	128.5
		0600	T.S.	992	18	32.7	126.8
		1200	T.D.	994	16	33.3	125.1

消散
Dissipated

熱帶低氣壓慧卓茹(9909)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL DEPRESSION RACHEL (9909)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
八月 Aug	5	1800	T.D.	995	13	20.9	116.0	
		6	0000	T.D.	995	13	21.2	116.6
	6	0600	T.D.	992	16	21.5	117.2	
		1200	T.D.	992	16	21.9	117.8	
		1800	T.D.	992	16	22.3	118.4	
		7	0000	T.D.	992	16	22.7	119.0
			0600	T.D.	992	16	23.3	120.0
	1200		T.D.	992	16	24.3	122.8	
	8	1800	T.D.	992	16	25.0	124.8	
		8	0000	T.D.	994	13	25.8	126.6

消散
Dissipated

颱風森姆(9910)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON SAM (9910)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
八月 Aug	19	0000	T.D.	1000	16	16.2	127.1
		0600	T.D.	1000	16	16.7	125.8
		1200	T.S.	998	18	17.1	124.5
		1800	T.S.	996	21	17.5	123.2
	20	0000	T.S.	990	23	17.9	121.8
		0600	T.S.	990	23	18.2	120.8
		1200	T.S.	990	23	18.4	120.2
		1800	S.T.S.	985	25	18.8	119.4
	21	0000	S.T.S.	980	28	19.3	118.6
		0600	S.T.S.	980	28	19.8	117.8
		1200	S.T.S.	980	28	20.4	116.9
		1800	S.T.S.	975	31	21.1	115.9
	22	0000	S.T.S.	975	31	21.7	115.2
		0600	T.	970	33	22.1	114.6
		(0900	S.T.S.	975	31	22.3	114.4)
		1200	S.T.S.	980	28	22.5	114.0
	23	1800	S.T.S.	985	25	22.9	113.3
		0000	T.S.	990	23	23.3	112.9
		0600	T.D.	1000	16	23.7	112.7
		1200	T.D.	1004	13	24.2	113.0

消散
Dissipated

熱帶風暴戴娜(9911)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM DORA (9911)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
八月 Aug	20	0000	T.S.	990	23	18.0	179.3
		0600	T.S.	990	23	18.5	178.1
		1200	T.S.	990	23	18.9	177.2
		1800	T.S.	990	23	19.4	176.3
	21	0000	T.S.	990	23	19.9	175.4
		0600	T.S.	994	21	20.5	174.3
		1200	T.S.	994	21	21.2	173.2
		1800	T.S.	996	18	21.9	172.1
	22	0000	T.D.	998	16	22.7	171.2
		0600	T.D.	998	16	23.4	170.3
		1200	T.D.	1000	13	24.1	169.5
		1800	T.D.	1000	13	24.9	168.8

消散
Dissipated

強烈熱帶風暴泰妮亞(9912)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 SEVERE TROPICAL STORM TANYA (9912)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
八月 Aug	20	0000	T.D.	1006	16	29.9	176.2
		0600	T.S.	1002	18	30.0	174.6
		1200	T.S.	1002	18	30.2	173.0
		1800	T.S.	1000	21	30.4	171.4
	21	0000	T.S.	1000	21	30.7	169.8
		0600	T.S.	998	23	31.1	168.2
		1200	T.S.	998	23	31.5	166.7
		1800	S.T.S.	994	25	32.0	165.2
	22	0000	S.T.S.	994	25	32.5	163.8
		0600	T.S.	996	23	33.1	162.4
		1200	T.S.	998	21	33.8	161.0
		1800	T.S.	998	21	34.6	159.7
	23	0000	T.S.	1000	18	35.4	158.7
		0600	T.D.	1002	16	36.4	157.9
		1200	T.D.	1002	16	37.6	157.8

消散
Dissipated

熱帶風暴維賽爾(9913)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM VIRGIL (9913)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
八月 Aug	24	1800	T.D.	1006	13	25.4	141.0
		25	0000	T.D.	1006	13	25.6
	25	0600	T.D.	1004	16	25.9	142.9
		1200	T.S.	1000	18	26.2	143.6
		1800	T.S.	996	23	26.5	144.1
		0000	T.S.	996	23	26.8	144.6
		0600	T.S.	996	23	27.2	145.1
		1200	T.S.	996	23	27.6	145.4
	26	1800	T.S.	996	23	28.0	145.7
		0000	T.S.	996	23	28.4	145.9
		0600	T.S.	998	21	28.7	146.1
		1200	T.S.	1000	18	29.0	146.4
		1800	T.S.	1000	18	29.3	146.7
		0000	T.D.	1002	16	29.5	147.2

消散
Dissipated

熱帶風暴芸蒂(9914)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM WENDY (9914)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
九月 Sep	1	0600	T.D.	1002	13	13.0	126.9
		1200	T.D.	1002	13	14.0	126.4
		1800	T.D.	1002	13	15.3	125.5
	2	0000	T.D.	1000	16	16.6	124.3
		0600	T.D.	1000	16	18.1	122.8
		1200	T.S.	996	18	19.0	121.7
	3	1800	T.S.	992	21	19.5	120.7
		0000	T.S.	990	23	20.0	119.6
		0600	T.S.	992	21	20.7	118.5
	4	1200	T.S.	992	21	21.5	117.5
		1800	T.S.	996	18	22.4	116.6
		0000	T.D.	998	16	23.9	116.1

消散
Dissipated

颱風約克(9915)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON YORK (9915)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
九月 Sep	12	0000	T.D.	996	13	17.3	123.8
		0600	T.D.	996	13	17.5	123.0
		1200	T.D.	996	13	17.7	122.2
		1800	T.D.	996	13	17.8	120.9
	13	0000	T.D.	994	16	18.1	119.0
		0600	T.S.	992	18	18.3	118.2
		1200	T.S.	990	21	18.7	117.6
		1800	T.S.	985	23	19.1	117.3
	14	0000	T.S.	985	23	19.5	117.1
		0600	T.S.	985	23	19.9	117.0
		1200	S.T.S.	980	25	20.4	116.9
		1800	S.T.S.	980	25	20.7	116.6
	15	0000	S.T.S.	980	28	21.0	116.1
		0600	S.T.S.	975	31	21.3	115.6
		1200	T.	970	33	21.4	115.5
		1800	T.	965	36	21.8	115.1
	16	0000	T.	965	36	22.1	114.3
		0600	T.	970	33	22.3	113.8
		1200	S.T.S.	980	28	22.5	113.3
		1800	T.S.	990	23	23.2	112.9
17	0000	T.D.	996	16	23.9	112.4	

消散
Dissipated

熱帶風暴思雅(9916)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM ZIA (9916)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
九月 Sep	13	0600	T.D.	1000	16	27.3	134.1
		1200	T.D.	1000	16	28.6	132.8
		1800	T.D.	1000	16	29.6	132.0
	14	0000	T.S.	996	18	30.4	131.4
		0600	T.S.	992	21	31.3	131.3
		1200	T.S.	992	21	32.1	131.6
	15	1800	T.S.	992	21	33.2	132.6
		0000	T.S.	996	18	34.4	134.6
		0600	T.D.	1000	16	35.7	136.7

消散
Dissipated

熱帶風暴安茵(9917)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM ANN (9917)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
九月 Sep	15	1800	T.D.	998	13	28.3	129.3	
		16	T.D.	996	16	29.0	128.8	
	16	0600	T.S.	994	18	29.3	128.3	
		1200	T.S.	990	21	29.5	127.8	
		1800	T.S.	990	21	29.6	127.2	
		17	0000	T.S.	990	21	29.7	126.6
			0600	T.S.	990	21	29.7	126.2
			1200	T.S.	990	21	29.8	125.7
	18	1800	T.S.	990	21	29.9	125.1	
		0000	T.S.	990	21	30.2	124.6	
		0600	T.S.	990	21	30.6	124.0	
		1200	T.S.	996	18	31.1	123.3	
		1800	T.S.	996	18	31.7	122.7	
		19	0000	T.D.	1000	16	32.5	122.0

消散
Dissipated

颱風巴特(9918)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON BART (9918)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
九月 Sep	18	1800	T.D.	1000	16	21.7	128.8	
		19	0000	T.S.	996	18	22.3	127.9
	19	0600	T.S.	992	21	22.8	127.0	
		1200	T.S.	990	23	23.2	126.2	
		1800	S.T.S.	985	25	23.4	125.7	
		20	0000	S.T.S.	980	28	23.6	125.4
			0600	T.	970	33	23.7	125.3
			1200	T.	965	36	23.8	125.3
	21	1800	T.	960	39	24.0	125.4	
		0000	T.	955	41	24.2	125.6	
		0600	T.	950	43	24.4	125.8	
		1200	T.	945	46	24.6	126.2	
		22	1800	T.	940	49	25.0	126.6
			0000	T.	935	51	25.4	126.8
	0600		T.	930	54	25.9	127.0	
	23	1200	T.	935	51	26.3	127.1	
		1800	T.	940	49	27.0	127.2	
		0000	T.	945	46	27.8	127.3	
		0600	T.	950	43	28.9	127.8	
		1200	T.	955	41	30.2	128.6	
		1800	T.	955	41	31.9	129.7	
	24	0000	T.	965	36	34.3	131.3	
		0600	T.	970	33	37.1	134.0	
		1200	S.T.S.	975	31	39.9	136.9	

變為溫帶氣旋
 Became Extratropical

強烈熱帶風暴錦雯(9919)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 SEVERE TROPICAL STORM CAM (9919)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
九月 Sep	24	0000	T.D.	1004	13	18.6	114.6
		0600	T.D.	1000	16	19.2	114.8
		1200	T.S.	996	18	19.8	115.0
		1800	T.S.	992	21	20.4	115.2
	25	0000	T.S.	990	23	21.0	115.4
		0600	S.T.S.	985	25	21.3	115.4
		1200	T.S.	990	23	21.5	115.3
		1800	T.S.	996	21	21.8	115.0
	26	0000	T.S.	996	21	22.1	114.6
		0600	T.D.	1000	16	22.5	113.8

消散
Dissipated

颱風丹尼(9920)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TYPHOON DAN (9920)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E	
十月 Oct	2	1800	T.D.	1004	13	16.8	131.4	
		3	0000	T.D.	1004	13	17.4	130.4
	3	0600	T.D.	1000	16	17.9	129.5	
		1200	T.S.	998	18	18.2	128.6	
		1800	T.S.	994	21	18.3	127.6	
		4	0000	T.S.	990	23	18.3	126.6
			0600	S.T.S.	980	28	18.2	125.6
	1200		S.T.S.	975	31	18.2	124.6	
	5	1800	T.	965	36	18.2	123.5	
		0000	T.	960	39	18.2	122.5	
		0600	T.	960	39	18.3	121.4	
		1200	T.	965	36	18.4	120.2	
	6	1800	T.	965	36	18.4	119.6	
		0000	T.	965	36	18.5	119.0	
		0600	T.	965	36	18.7	118.4	
		1200	T.	965	36	19.1	117.9	
	7	1800	T.	965	36	19.5	117.7	
		0000	T.	965	36	19.9	117.8	
		0600	T.	965	36	20.3	118.0	
		1200	T.	960	39	20.7	118.1	
	8	1800	T.	965	36	21.2	118.1	
		0000	T.	965	36	21.7	118.1	
		0600	T.	965	36	22.1	118.1	
		1200	T.	960	39	22.5	118.1	
	9	1800	T.	960	39	23.2	118.2	
		0000	T.	960	39	23.9	118.1	
		0600	S.T.S.	975	31	24.5	118.0	
		1200	T.S.	990	23	25.1	118.0	
	10	0000	1800	T.S.	1000	18	25.6	118.1
			T.D.	1006	13	26.0	118.8	

消散
Dissipated

熱帶風暴伊芙(9921)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL STORM EVE (9921)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
十月 Oct	17	0600	T.D.	1000	16	15.6	119.4
		1200	T.S.	996	18	16.4	118.3
		1800	T.S.	996	18	17.1	117.3
	18	0000	T.S.	992	21	17.4	116.2
		0600	T.S.	992	21	17.3	115.1
		1200	T.S.	992	21	16.9	113.5
		1800	T.S.	990	23	16.4	112.0
	19	0000	T.S.	992	21	16.0	110.4
		0600	T.S.	996	18	16.1	109.2
		1200	T.S.	996	18	16.6	108.2
		1800	T.S.	996	18	17.0	107.4
	20	0000	T.D.	998	16	17.4	106.6

消散
Dissipated

熱帶低氣壓法蘭基的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 TROPICAL DEPRESSION FRANKIE**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
十一月 Nov	7	0600	T.D.	1000	13	10.2	129.5
		1200	T.D.	1000	13	10.6	128.3
		1800	T.D.	994	16	11.1	127.1
	8	0000	T.D.	994	16	11.7	126.0
		0600	T.D.	994	16	12.1	124.8
		1200	T.D.	994	16	12.3	123.6
	9	1800	T.D.	994	16	12.3	122.5
		0000	T.D.	998	13	12.0	122.7
		0600	T.D.	998	13	12.4	123.4
	10	1200	T.D.	998	13	12.7	124.1
		1800	T.D.	998	13	13.1	124.8
		0000	T.D.	998	13	13.6	125.4

消散
Dissipated

強烈熱帶風暴姬羅莉亞(9922)的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 SEVERE TROPICAL STORM GLORIA (9922)**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
十一月 Nov	13	1200	T.D.	1002	13	16.0	131.3
		1800	T.D.	1000	16	17.1	130.9
	14	0000	T.S.	998	18	18.1	130.7
		0600	T.S.	994	21	19.1	130.5
		1200	T.S.	985	23	20.1	130.5
		1800	S.T.S.	975	25	21.1	130.7
	15	0000	S.T.S.	975	25	22.3	131.3
		0600	S.T.S.	975	25	23.9	132.2
		1200	S.T.S.	975	25	25.6	134.0
		1800	S.T.S.	975	25	27.7	137.8
	16	0000	S.T.S.	975	25	30.0	142.1
		0600	S.T.S.	975	25	32.7	146.9

變為溫帶氣旋
 Became Extratropical

熱帶低氣壓由十二月十四日至十六日的每六小時之位置及強度
**SIX-HOURLY POSITION AND INTENSITY DATA OF
 THE TROPICAL DEPRESSION OF 14 - 16 DECEMBER**

月份 Month	日期 Date	時間 (協調世界時) Time (UTC)	強度 Intensity	估計最低 中心氣壓 (百帕斯卡) Estimated minimum central pressure (hPa)	估計 最高風速 (米每秒) Estimated maximum surface winds (m/s)	北緯 Lat. °N	東經 Long. °E
十二月 Dec	14	0600	T.D.	1000	16	10.7	113.7
		1200	T.D.	1000	16	11.1	113.1
		1800	T.D.	1000	16	11.3	112.4
	15	0000	T.D.	1000	16	11.4	111.7
		0600	T.D.	1000	16	11.5	111.2
		1200	T.D.	1000	16	11.7	110.7
	16	1800	T.D.	1002	13	11.8	110.2
		0000	T.D.	1002	13	12.0	109.7

消散
Dissipated