3.5 強烈熱帶風暴瑪娃 (1716)：二零一七年八月三十一日至九月四日

瑪娃是二零一七年第五個導致香港天文台需要發出熱帶氣旋警告信號的熱帶氣旋。

熱帶低氣壓瑪娃於八月三十一日下午在東沙之東南偏東約270公里的南海北部上形成，緩慢向西北偏北移動，並於九月一日晚上增強為熱帶風暴。隨後兩天瑪娃大致採取西北路徑緩慢靠近廣東東部沿岸，九月二日上午增強為強烈熱帶風暴並達到其最高強度，中心附近最高持續風速估計為每小時90公里。瑪娃於九月三日減弱為熱帶風暴，當晚在汕尾附近登陸，翌日在廣東內陸減弱為一個低壓區。

根據報章報導，受瑪娃帶來的狂風暴雨影響，潮汕和珠三角地區出現嚴重水浸，海陸空交通大受影響。廣東有約11萬戶停電，而澳門多處地方亦有水浸報告。

香港天文台於九月二日上午2時20分發出一號戒備信號，當時瑪娃集結在香港之東南偏東約400公里。九月二日本港吹微風，天文台總部於當日下午3時21分錄得最低瞬時海平面氣壓1002.8百帕斯卡，當時瑪娃在香港之東南偏東約310公里。隨著瑪娃逐漸靠近廣東沿岸，九月三日日間本港普遍吹和緩西至西北風。雖然瑪娃於九月三日晚上在汕尾附近登陸及逐漸減弱，但仍然進一步接近本港，天文台在10時40分發出三號強風信號，當時瑪娃集結在香港之東北偏東約190公里。本港風勢逐漸增強，黎明時分本港普遍吹清勁至強風程度的西南風。瑪娃於九月四日上午8時左右最接近香港，在本港之東北偏北約120公里附近掠過。隨著瑪娃開始遠離香港及繼續減弱，本港風勢緩和，天文台在九月四日上午10時20分以一號戒備信號取代三號強風信號。下午瑪娃在廣東內陸減弱為一個低壓區，天文台於下午2時10分取消所有熱帶氣旋警告信號。

瑪娃影響香港期間，尖鼻咀錄得最高潮位2.89米(海圖基準面以上)及最大風暴潮(天文潮高度以上)0.44米。

受一股內陸氣流影響，九月二日本港有煙霞，短暫時間有陽光，黃昏有狂風雷暴。瑪娃的雨帶在九月三日及四日為本港帶來狂風大驟雨及雷暴。九月二至四日這三天期間本港普遍錄得超過50毫米雨量，而大嶼山、長洲、葵涌及屯門的雨量更超過100毫米。

瑪娃吹襲香港期間，西環及大圍有大樹倒塌壓毀幾輛私家車，輕鐵綫列車服務亦因大樹倒塌而一度受阻。九月三日黃昏大雨期間，大嶼山水口村有村屋遭受水浸。

表3.5.1 - 3.5.4 分別是瑪娃影響香港期間各站錄得的最高風速、持續風力達到強風程度的時段、香港的日雨量及最高潮位資料。圖3.5.1 - 3.5.3 分別為瑪娃的路徑圖、本港的雨量分佈圖及香港各站錄得的風向和風速。圖3.5.4 - 3.5.5 分別為瑪娃的衛星及雷達圖像。

3.5 Severe Tropical Storm Mawar (1716): 31 August – 4 September 2017

Mawar was the fifth tropical cyclone necessitating the issuance of tropical cyclone warning signal by the Hong Kong Observatory in 2017.

Mawar formed as a tropical depression over the northern part of the South China Sea about 270 km east-southeast of Dongsha on the afternoon of 31 August. It drifted north-northwestwards slowly and intensified into a tropical storm on the night of 1 September. Tracking slowly to the northwest towards the coast of eastern Guangdong over the next two days, Mawar intensified into a severe tropical storm on the morning of 2 September and reached its peak intensity with an estimated sustained wind of 90 km/h near its centre. It then weakened into a tropical storm on 3 September, making landfall near Shanwei that night and degenerating into an area of low pressure over inland Guangdong the next day.

According to press reports, torrential rain and squalls brought by Mawar caused severe flooding in the Chaozhou-Shantou region and the Pearl River Delta, seriously disrupting transportation services. Electricity supply to around 110 000 households was interrupted in Guangdong and flooding was reported in many places in Macao.

In Hong Kong, the Standby Signal No. 1 was issued at 2:20 a.m. on 2 September when Mawar was about 400 km east-southeast of the territory. Local winds were light on 2 September and the lowest instantaneous mean sea-level pressure of 1002.8 hPa was recorded at the Observatory headquarters at 3:21 p.m. on 2 September when Mawar was about 310 km east-southeast of Hong Kong. With Mawar moving gradually closer to the coast of Guangdong, local winds became moderate west to northwesterlies during the day on 3 September. Although Mawar made landfall near Shanwei and weakened gradually on the night of 3 September, it continued to edge closer to Hong Kong. The Strong Wind Signal No. 3 was issued at 10:40 p.m. that night when Mawar was about 190 km east-northeast of Hong Kong. Winds strengthened gradually and became fresh to strong southwesterlies around dawn. Mawar came closest to the territory around 8 a.m. on 4 September, passing at a distance of about 120 km to the north-northeast of Hong Kong. As Mawar started to move away from Hong Kong and continued to weaken, local winds subsided and the Strong Wind Signal No. 3 was replaced by the Standby Signal No. 1 at 10:20 a.m. on 4 September. With Mawar degenerating into an area of low pressure over inland Guangdong in the afternoon, all tropical cyclone warning signals were cancelled at 2:10 p.m.

A maximum sea level (above chart datum) of 2.89 m and a maximum storm surge (above astronomical tide) of 0.44 m were recorded at Tsim Bei Tsui during the passage of Mawar.

Under the influence of a continental airstream, the weather in Hong Kong was hazy with sunny intervals and evening squally thunderstorms on 2 September. The rainbands of Mawar brought heavy squally showers and thunderstorms to the territory on 3 and 4 September. More than 50 millimetres of rainfall were generally recorded in Hong Kong during the 3-day period of 2 - 4 September, with rainfall over Lautau Island, Cheung Chau, Kwai Chung and Tuen Mun exceeding 100 millimetres.

In Hong Kong, several private cars were damaged by fallen trees in Sai Wan and Tai Wai. Fallen trees also led to a disruption of light rail services. Village houses in Shui Hau Tsuen of Lautau Island were flooded during the heavy rain on the evening of 3 September.

Information on the maximum wind, period of strong force winds, daily rainfall and maximum sea level reached in Hong Kong during the passage of Mawar is given in Tables 3.5.1 - 3.5.4 respectively. Figures 3.5.1 - 3.5.3 show respectively the track of Mawar, the rainfall distribution for Hong Kong and the winds recorded at various stations in Hong Kong. Fugures 3.5.4 - 3.5.5 show respectively a satellite imagery and a radar imagery of Mawar.

表 3.5.1　在瑪娃影響下，本港各站在熱帶氣旋警告信號生效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 when the tropical cyclone warning signals for Mawar were in force

站 (參閱圖 1.1) Station (See Fig. 1.1)		最高陣風 Maximum Gust					最高每小時平均風速 Maximum Hourly Mean Wind				
		風向 Direction		風速(公里/時) Speed (km/h)	日期/月份 Date/Month	時間 Time	風向 Direction		風速(公里/時) Speed (km/h)	日期/月份 Date/Month	時間 Time
黃麻角(赤柱)	Bluff Head (Stanley)	西	W	51	4/9	01:37	西南偏西	WSW	25	4/9	02:00
中環碼頭	Central Pier	西南偏西	WSW	58	4/9	09:43	西	W	22	3/9	15:00
長洲	Cheung Chau	西南偏南	SSW	65	4/9	02:42	南	S	45	4/9	03:00
長洲泳灘	Cheung Chau Beach	西南	SW	59	4/9	05:22	西南	SW	38	4/9	08:00
香港國際機場	Hong Kong International Airport	西南	SW	63	4/9	06:50	西南	SW	45	4/9	08:00
啟德	Kai Tak	西南	SW	59	4/9	08:06	西南	SW	25	4/9	10:00
京士柏	King's Park	西南偏西	WSW	43	4/9	08:57	西	W	16	4/9	08:00
流浮山	Lau Fau Shan	西南偏南	SSW	75	4/9	07:14	西南偏南	SSW	40	4/9	08:00
北角	North Point	西南偏西	WSW	54	4/9	11:38	西	W	31	4/9	12:00
坪洲	Peng Chau	東北	NE	63	3/9	18:12	西南	SW	25	4/9	07:00
							西南	SW	25	4/9	08:00
平洲	Ping Chau	西	W	43	4/9	00:25	西	W	22	4/9	01:00
西貢	Sai Kung	西南	SW	43	4/9	11:22	西南偏西	WSW	16	4/9	12:00
沙洲	Sha Chau	西南偏南	SSW	67	4/9	05:39	西南偏南	SSW	47	4/9	06:00
沙螺灣	Sha Lo Wan	西南偏南	SSW	67	4/9	10:55	西南	SW	31	4/9	07:00
沙田	Sha Tin	西南	SW	49	4/9	08:14	西南	SW	23	4/9	09:00
石崗	Shek Kong	西南	SW	31	4/9	13:06	西南偏西	WSW	12	4/9	12:00
九龍天星碼頭	Star Ferry (Kowloon)	西南偏西	WSW	70	4/9	07:48	西	W	31	4/9	08:00
打鼓嶺	Ta Kwu Ling	西南	SW	36	4/9	11:29	西南偏南	SSW	13	4/9	11:00
大美督	Tai Mei Tuk	西	W	51	4/9	13:22	西	W	31	3/9	23:00
大帽山	Tai Mo Shan	西南	SW	81	4/9	06:13	西南	SW	59	4/9	12:00
		西南	SW	81	4/9	11:35					
大埔滘	Tai Po Kau	西北偏西	WNW	47	4/9	09:38	西北	NW	16	3/9	23:00
塔門	Tap Mun	西	W	51	3/9	23:26	西	W	27	4/9	00:00
大老山	Tate's Cairn	西南偏南	SSW	81	4/9	07:57	西南偏南	SSW	52	4/9	11:00
		西南偏南	SSW	81	4/9	09:48					
將軍澳	Tseung Kwan O	南	S	52	4/9	07:49	西南偏南	SSW	12	4/9	02:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	西南偏南	SSW	40	4/9	07:47	南	S	20	4/9	04:00
屯門政府合署	Tuen Mun Government Offices	西南	SW	54	4/9	07:13	西南偏南	SSW	16	4/9	08:00
橫瀾島	Waglan Island	西南偏西	WSW	81	4/9	09:40	西南偏西	WSW	63	4/9	04:00
濕地公園	Wetland Park	西南偏南	SSW	40	4/9	10:02	南	S	12	4/9	07:00
							南	S	12	4/9	08:00
黃竹坑	Wong Chuk Hang	西南偏西	WSW	40	4/9	05:55	西北偏西	WNW	13	4/9	14:00

*新塔門測風站在 2017 年 7 月 6 日取代在塔門警崗屋頂的舊測風站

*The old wind station on the rooftop of Tap Mun Police Post is replaced by the new Tap Mun station on 6 July 2017.

青洲、昂坪- 沒有資料　Green Island, Ngong Ping - data not available

表 3.5.2　在瑪娃影響下，熱帶氣旋警告信號系統的八個參考測風站在熱帶氣旋警告信號生效時錄得持續風力達到強風程度的時段

Table 3.5.2　Periods during which sustained strong winds were attained at the eight reference anemometers in the tropical cyclone warning system when tropical cyclone warning signals for Mawar were in force

站 (參閱圖 1.1) Station (See Fig. 1.1)		最初達到強風*時間 Start time when strong wind speed* was attained		最後達到強風*時間 End time when strong wind speed* was attained	
		日期/月份 Date/Month	時間 Time	日期/月份 Date/Month	時間 Time
長洲	Cheung Chau	4/9	0126	4/9	1103
香港國際機場	Hong Kong International Airport	2/9	1737	4/9	1106
流浮山	Lau Fau Shan	4/9	0659	4/9	0727

啟德、西貢、沙田、打鼓嶺及青衣島蜆殼油庫的持續風力未達到強風程度。

The sustained wind speed did not attain strong force at Kai Tak, Sai Kung, Sha Tin, Ta Kwu Ling and Tsing Yi Shell Oil Depot.

* 十分鐘平均風速達每小時 41-62 公里

* 10-minute mean wind speed of 41- 62 km/h

註: 本表列出持續風力達到強風程度的起始及終結時間。期間風力可能高於或低於指定的風力。

Note: The table gives the start and end time of sustained strong force winds. Winds might fluctuate above or below the specified wind speeds in between the times indicated.

表 3.5.3　瑪娃掠過期間，香港天文台總部及其他各站所錄得的日雨量

Table 3.5.3　Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Mawar

站 (參閱圖 3.5.2) Station (See Fig. 3.5.2)			九月二日 2 Sep	九月三日 3 Sep	九月四日 4 Sep	總雨量(毫米) Total rainfall (mm)
香港天文台 Hong Kong Observatory			1.0	23.8	32.8	57.6
香港國際機場 Hong Kong International Airport (HKA)			16.1	32.0	41.3	89.4
長洲 Cheung Chau (CCH)			21.0	35.5	63.5	120.0
H23	香港仔	Aberdeen	0.5	16.5	32.0	49.0
N05	粉嶺	Fanling	2.0	35.0	32.5	69.5
N13	糧船灣	High Island	0.5	8.5	31.5	40.5
K04	佐敦谷	Jordan Valley	0.0	6.5	59.5	66.0
N06	葵涌	Kwai Chung	1.0	62.0	55.0	118.0
H12	半山區	Mid Levels	5.5	49.5	55.0	110.0
N09	沙田	Sha Tin	0.5	5.5	19.5	25.5
H19	筲箕灣	Shau Kei Wan	0.5	12.5	30.5	43.5
SEK	石崗	Shek Kong	9.0	29.5	20.5	59.0
K06	蘇屋邨	So Uk Estate	5.5	46.5	55.5	107.5
R31	大美督	Tai Mei Tuk	[0.5]	0.5	[39.0]	[40.0]
R21	踏石角	Tap Shek Kok	[4.0]	14.5	[60.5]	[79.0]
TMR	屯門水庫	Tuen Mun Reservoir	5.8	21.2	59.9	86.9
N17	東涌	Tung Chung	18.5	78.0	53.0	149.5

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

表 3.5.4　瑪娃掠過期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

Table 3.5.4　Times and heights of the maximum sea level and the maximum storm surge recorded at tide stations in Hong Kong during the passage of Mawar

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	2.41	3/9	06:22	0.35	3/9	03:32
石壁	Shek Pik	2.48	3/9	06:42	0.29	3/9	04:28
大廟灣	Tai Miu Wan	2.39	3/9	06:39	0.41	3/9	02:56
大埔滘	Tai Po Kau	2.36	2/9	07:23	0.40	3/9	03:15
尖鼻咀	Tsim Bei Tsui	2.89	4/9	08:11	0.44	2/9	18:08
橫瀾島	Waglan Island	2.42	3/9	06:33	0.27	3/9	03:24

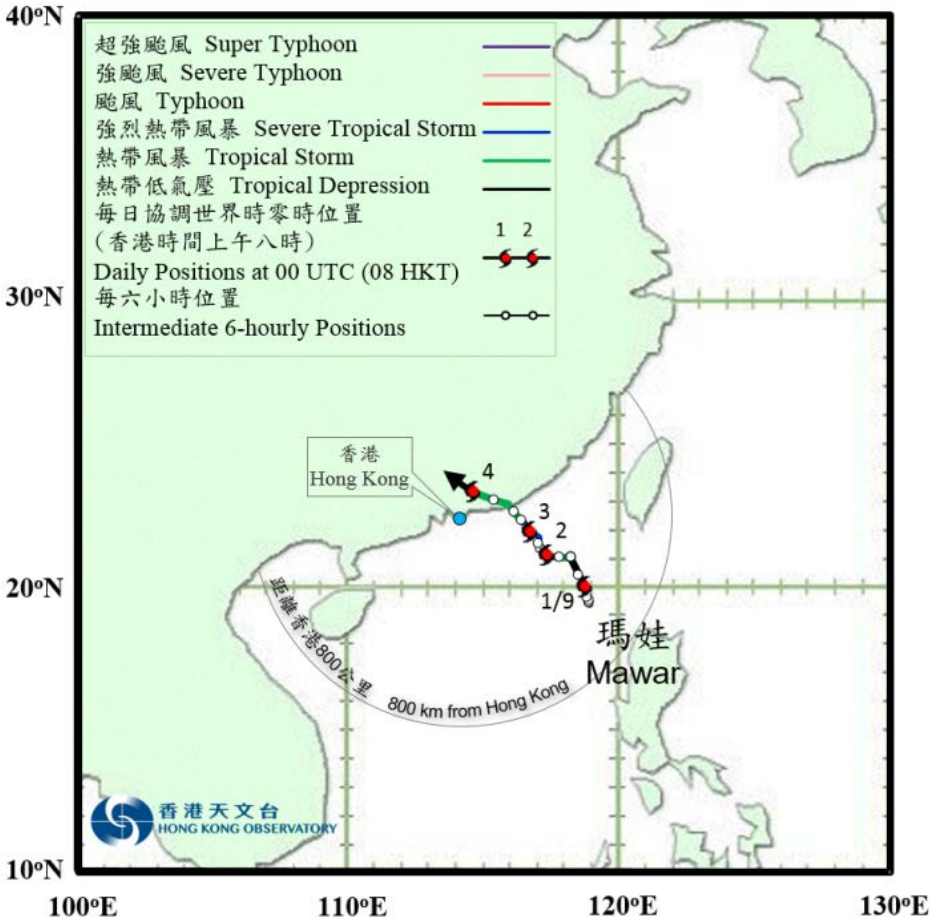

圖 3.5.1a　　二零一七年八月三十一日至九月四日瑪娃的路徑圖。

Figure 3.5.1a　Track of Mawar on 31 August - 4 September 2017.

圖 3.5.1b　　瑪娃接近香港時的路徑圖。

Figure 3.5.1b　Track of Mawar in the vicinity of Hong Kong.

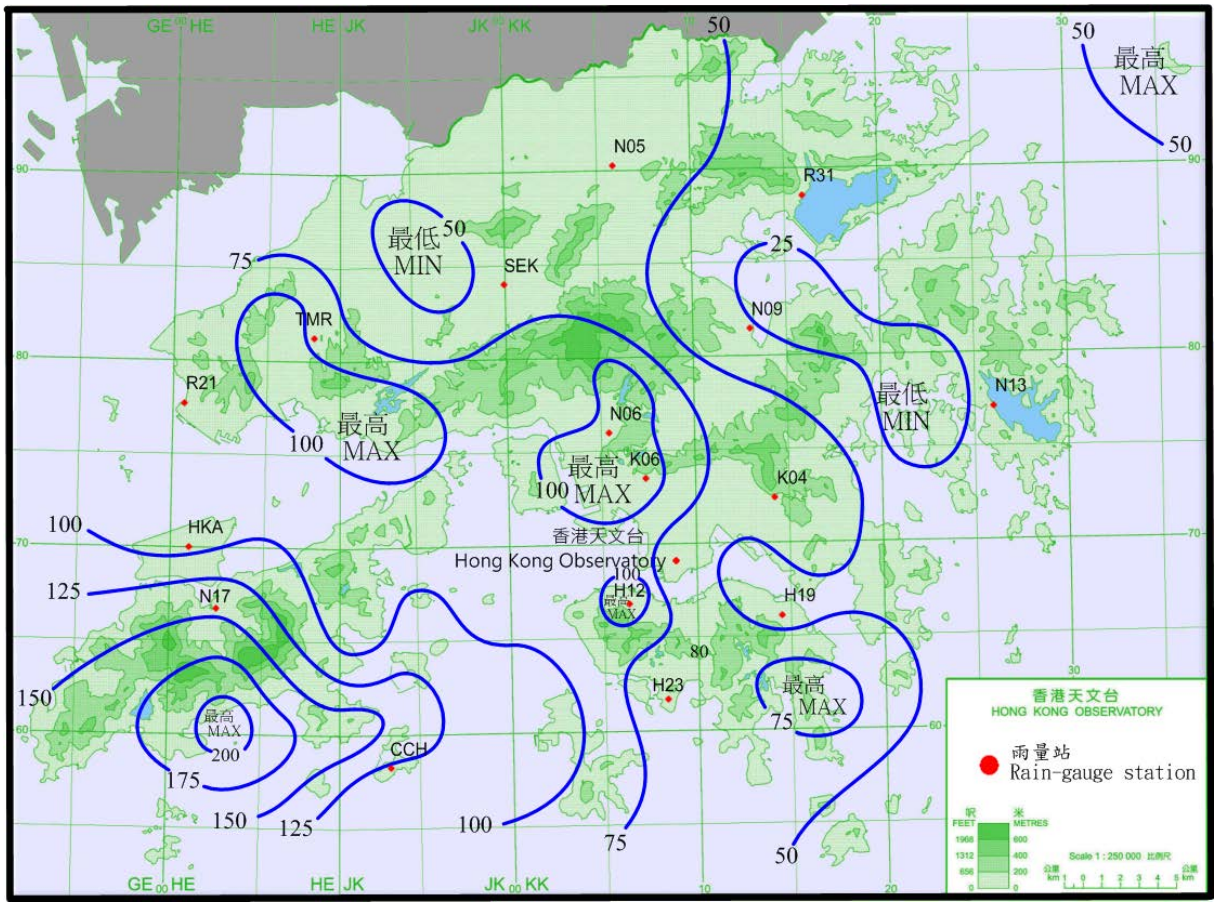

圖 3.5.2　　二零一七年九月二日至四日的雨量分佈(等雨量線單位為毫米)。

Figure 3.5.2　　Rainfall distribution on 2 – 4 September 2017 (isohyets in millimetres).

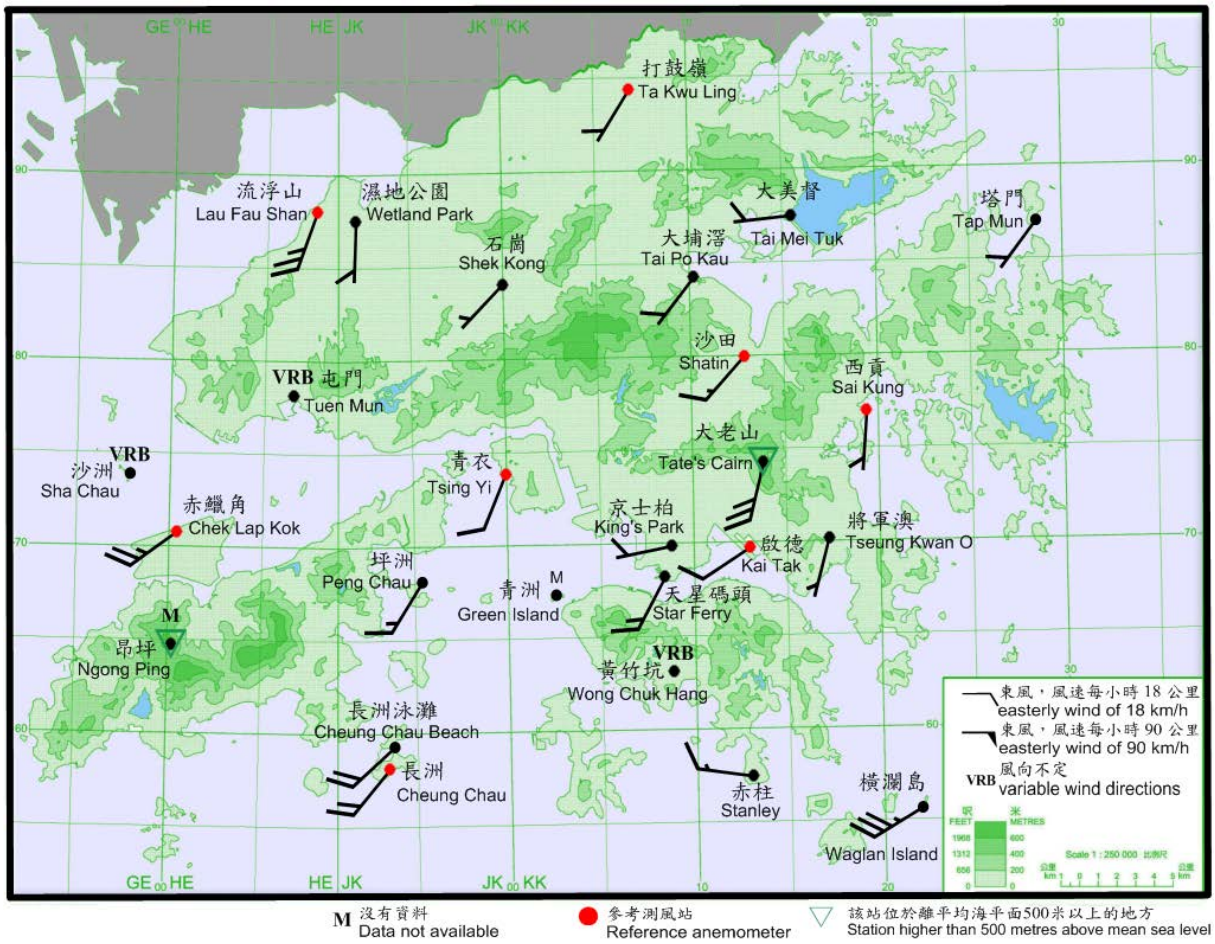

圖 3.5.3　二零一七年九月四日上午 7 時 10 分香港各站錄得的十分鐘平均風向和風速。當時赤鱲角、流浮山、大老山及橫瀾島風力達到強風程度。

Figure 3.5.3　10-minute mean wind direction and speed recorded at various stations in Hong Kong at 7:10 a.m. on 4 September 2017. Winds at Chek Lap Kok, Lau Fau Shan, Tate's Cairn, Waglan Island reached strong force at that time.

註:　當時沙洲、屯門及黃竹坑錄得的十分鐘平均風速分別為每小時 23、14 及 9 公里。

Note:　The 10-minute mean wind speeds recorded at the time at Sha Chau, Tuen Mun and Wong Chuk Hang were 23, 14 and 9 km/h respectively.

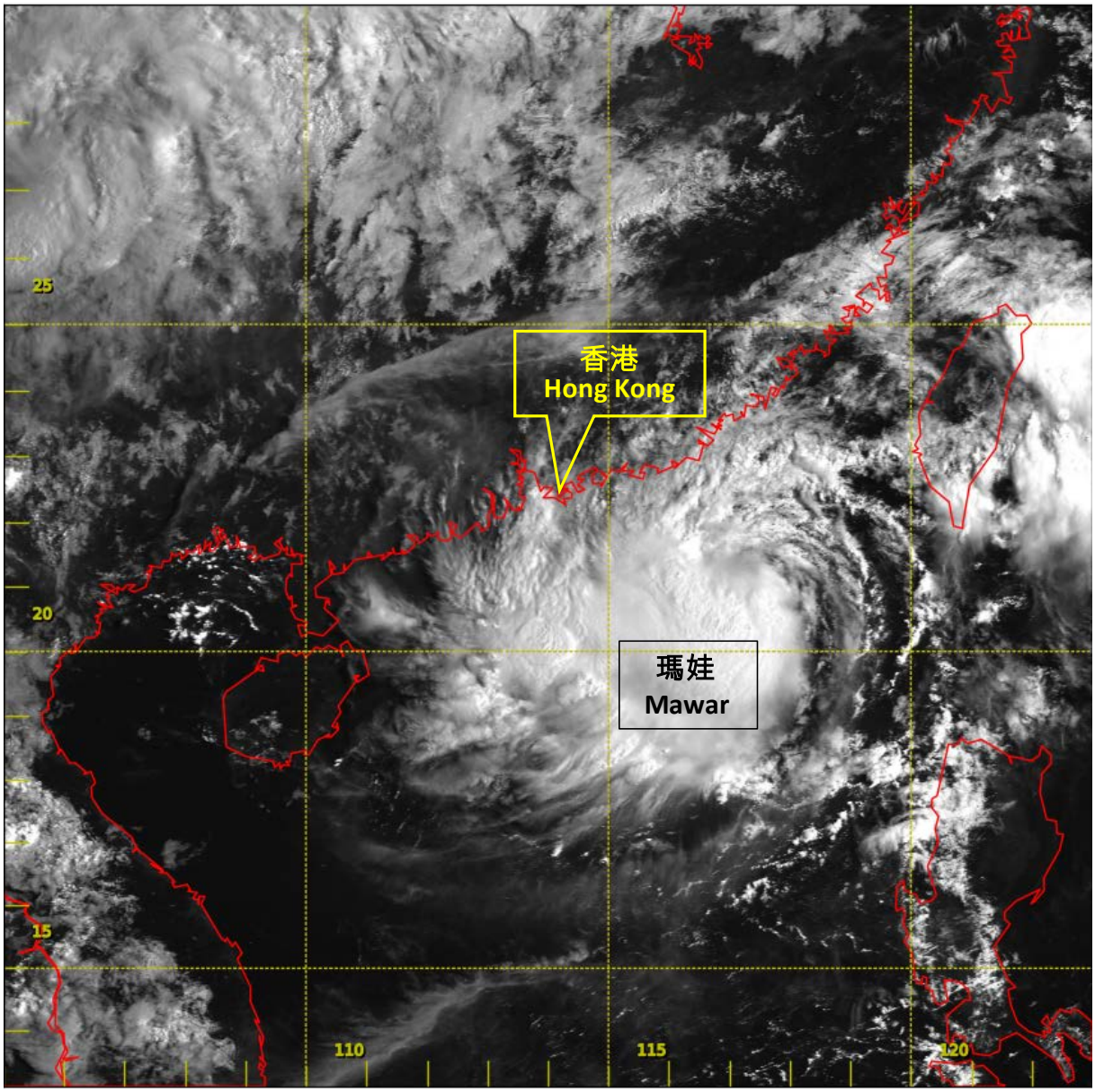

圖 3.5.4　二零一七年九月二日上午八時正的可見光衛星圖片，當時瑪娃達到其最高強度，中心附近最高持續風速估計為每小時 90 公里。

Figure 3.5.4　Visible satellite imagery at 8:00 a.m. on 2 September 2017 as Mawar reached its peak intensity with an estimated maximum sustained wind of 90 km/h near its centre.

〔此衛星圖像接收自日本氣象廳的向日葵 8 號衛星。〕
[The satellite imagery was originally captured by Himawari-8 Satellite (H-8) of Japan Meteorological Agency (JMA).]

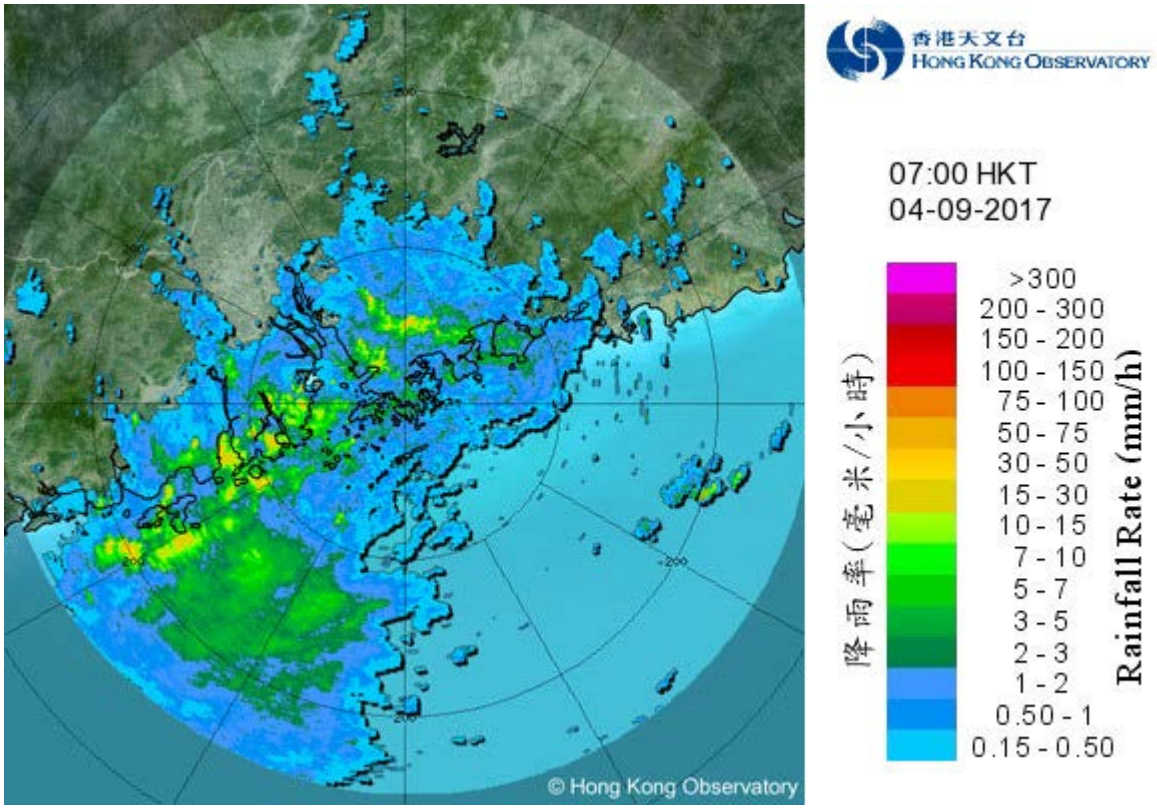

圖 3.5.5　二零一七年九月四日上午七時正的雷達圖像，當時瑪娃正橫過廣東內陸，與其相關的雨帶正影響廣東及南海北部。

Figure 3.5.5　Radar image at 7:00 a.m. on 4 September 2017 when Mawar was moving across inland Guangdong and its rainbands affecting Guangdong and the northern part of the South China Sea.