第三節　二零一七年影響香港的熱帶氣旋

3.1　強烈熱帶風暴苗柏 (1702)：二零一七年六月十一日至十三日

苗柏是二零一七年首個影響香港的熱帶氣旋。苗柏吹襲香港期間，天文台需要發出八號烈風或暴風信號。苗柏的中心在六月十二日晚上橫過香港東部水域，是自二零零八年八月颱風鸚鵡後再次有熱帶氣旋的中心進入香港境內。

熱帶低氣壓苗柏於六月十一日凌晨在東沙以南約580公里的南海中部上形成，向西北偏北移動，當日下午增強為熱帶風暴。翌日苗柏繼續移近廣東沿岸地區，當晚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 105 公里。午夜前苗柏在大鵬半島登陸並減弱為熱帶風暴，六月十三日上午苗柏採取東北偏北路徑橫過廣東，下午在江西消散。

根據報章報導，苗柏為廣東帶來狂風大雨，多處地區出現水浸，超過 12 萬人受災，直接經濟損失達 2.6 億元人民幣。汕尾有超過 45 000 戶電力供應受影響。

香港天文台在六月十一日晚上 7 時 40 分發出一號戒備信號，當時苗柏集結在香港之東南偏南約530公里。晚間本港吹和緩偏東風。隨著苗柏靠近廣東沿岸，天文台在六月十二日早上 10 時 40 分發出三號強風信號，當時苗柏位於香港之東南偏南約 210 公里。下午本港逐漸轉吹清勁至強風程度的東至東北風，離岸間中吹烈風。下午 5 時 20 分天文台發出八號東北烈風或暴風信號，當時苗柏集結在香港天文台之東南偏南約 90 公里。本港風力顯著增強，普遍吹強風至烈風程度的北至東北風，離岸及高地風力更間中達到暴風程度。

苗柏趨近香港時開始採取較偏北路徑移動，本港轉吹西北風，天文台在晚上 8 時 20 分改發八號西北烈風或暴風信號。苗柏橫過香港東部水域，晚上 9 時 30 分最為接近，其中心在天文台總部以東約 25 公里處掠過。午夜前苗柏在大鵬半島登陸，本港逐漸轉吹西南風，天文台在六月十三日上午 12 時 10 分改發八號西南烈風或暴風信號。隨著苗柏移入內陸及減弱，本港風力隨即緩和，天文台於上午 4 時 40 分改發三號強風信號，取代八號西南烈風或暴風信號，並於當日早上 11 時 10 分取消所有熱帶氣旋警告信號。

在苗柏的影響下，九龍天星碼頭、橫瀾島及大老山錄得的最高每小時平均風速分別為每小時 59、87 及 85 公里，而最高陣風則分別為每小時 77、113 及 131 公里。尖鼻咀錄得最高潮位 2.86 米(海圖基準面以上)，而大埔滘則錄得最大風暴

潮(天文潮高度以上)0.55 米。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 (百帕斯卡)	日期/月份	時間
香港天文台總部	995.5	12/6	下午 8 時 08 分
香港國際機場	998.4	12/6	下午 7 時 53 分
京士柏	995.5	12/6	下午 8 時 23 分
坪洲	996.1	12/6	下午 7 時 44 分
打鼓嶺	996.7	12/6	下午 10 時 16 分
大埔	996.0	12/6	下午 9 時 50 分
沙田	995.1	12/6	下午 9 時 51 分
上水	997.2	12/6	下午 9 時 46 分
流浮山	998.2	12/6	下午 8 時 47 分
長洲	996.0	12/6	下午 7 時 39 分
橫瀾島	989.7	12/6	下午 7 時 51 分

六月十一日本港大致天晴，日間天氣酷熱。受苗柏相關的雨帶影響，六月十二日及十三日本港有狂風大驟雨及雷暴。雨勢在六月十三日早上最大，當時天文台曾發出紅色暴雨警告、山泥傾瀉警告、新界北部水浸特別報告及雷暴警告。這兩天期間本港普遍錄得超過 150 毫米雨量，市區的雨量更超過 250 毫米。

苗柏吹襲香港期間，最少有十人受傷，另有超過600宗塌樹報告、20宗水浸報告及兩宗山泥傾瀉報告。上環一座商業大廈的玻璃幕牆爆裂，而土瓜灣一座大廈有鋁窗墜下，兩部私家車受損。在六月十三日早上的暴雨期間，多區道路出現水浸，交通大受影響。赤柱大潭道一幅護土牆在暴雨下倒塌。新界約300公頃的農地受到影響。香港國際機場有超過500班航班取消或延誤。

表3.1.1 - 3.1.4分別是苗柏影響香港期間各站錄得的最高風速、持續風力達到強風及烈風程度的時段、香港的日雨量及最高潮位資料。圖3.1.1 - 3.1.2分別為苗柏的路徑圖和本港的雨量分佈圖。圖3.1.3顯示香港各站錄得的風向和風速。圖3.1.4顯示天文台總部及橫瀾島錄得的海平面氣壓。圖3.1.5 - 3.1.6分別為苗柏的衛星及雷達圖像。苗柏在香港造成的破壞可參見圖3.1.7。

Section 3 TROPICAL CYCLONES AFFECTING HONG KONG IN 2017

3.1 Severe Tropical Storm Merbok (1702): 11 – 13 June 2017

Merbok was the first tropical cyclone affecting Hong Kong in 2017 and the No. 8 Gale or Storm Signal was issued by the Hong Kong Observatory during its passage. The centre of Merbok moved across the eastern part of Hong Kong waters on the night of 12 June, the first time the centre of a tropical cyclone entered the territory of Hong Kong since Typhoon Nuri in August 2008.

Merbok formed as a tropical depression over the central part of the South China Sea about 580 km south of Dongsha in the small hours of 11 June. Moving north-northwestwards, it intensified into a tropical storm that afternoon. Merbok continued to move closer to the coastal areas of Guangdong on 12 June and intensified into a severe tropical storm that night, reaching its peak intensity with an estimated sustained wind of 105 km/h near its centre. It made landfall over the Dapeng Peninsula before midnight and weakened into a tropical storm. Taking on a north-northeasterly track, Merbok moved across Guangdong on the morning of 13 June and dissipated over Jiangxi in the afternoon.

According to press reports, Merbok brought heavy rain and squalls to Guangdong with extensive flooding. At least 120 000 people were affected with a direct economic loss reaching 260 million RMB. Electricity supply to more than 45 000 households was interrupted in Shanwei.

In Hong Kong, the No. 1 Standby Signal was issued at 7:40 p.m. on 11 June when Merbok was about 530 km south-southeast of the territory. Local winds were moderate easterlies during the night. As Merbok edged closer to the coast of Guangdong, the No. 3 Strong Wind Signal was issued at 10:40 a.m. on 12 June when Merbok was about 210 km south-southeast of Hong Kong. Local winds gradually became fresh to strong east to northeasterlies in the afternoon and occasionally reaching gale force offshore. The No. 8 Northeast Gale or Storm Signal was issued at 5:20 p.m. on 12 June when Merbok was about 90 km south-southeast of the Hong Kong Observatory. Local winds strengthened significantly, becoming generally strong to gales force from north to northeast, with winds reaching storm force occasionally offshore and on high ground.

With Merbok taking on a more northerly track on its approach, winds started to turn northwesterly and the No. 8 Northwest Gale or Storm Signal was issued at 8:20 p.m. Merbok traversed the eastern part of Hong Kong waters and came closest to the Observatory Headquarters around 9:30 p.m. that evening with its centre located about 25 km to the east. Merbok made landfall over the Dapeng Peninsula before midnight and local winds gradually turned southwesterly. The No. 8 Southwest Gale or Storm Signal was issued at 12:10 a.m. on 13 June. With Merbok moving inland and weakening, local winds soon subsided. The No. 8 Southwest Gale or Storm Signal was replaced by the No. 3 Strong Wind Signal at 4:40 a.m. on 13 June, and all tropical cyclone warning signals were cancelled at 11:10 a.m. later that morning.

Under the influence of Merbok, maximum hourly mean winds of 59, 87 and 85 km/h and gusts of 77, 113 and 131 km/h were recorded at Star Ferry (Kowloon), Waglan Island and Tate's Cairn respectively. A maximum sea level (above chart datum) of 2.86 m was recorded

at Tsim Bei Tsui, and a maximum storm surge (above astronomical tide) of 0.55 m was recorded at Tai Po Kau. The lowest instantaneous mean sea-level pressures recorded at some selected stations are as follows:

Station	Lowest instantaneous mean sea-level pressure (hPa)	Date/Month	Time
Hong Kong Observatory Headquarters	995.5	12/6	8:08 p.m.
Hong Kong International Airport	998.4	12/6	7:53 p.m.
King's Park	995.5	12/6	8:23 p.m.
Peng Chau	996.1	12/6	7:44 p.m.
Ta Kwu Ling	996.7	12/6	10:16 p.m.
Tai Po	996.0	12/6	9:50 p.m.
Shatin	995.1	12/6	9:51 p.m.
Sheung Shui	997.2	12/6	9:46 p.m.
Lau Fau Shan	998.2	12/6	8:47 p.m.
Cheung Chau	996.0	12/6	7:39 p.m.
Waglan Island	989.7	12/6	7:51 p.m.

Locally, it was mainly fine and very hot during the day on 11 June. The rainbands associated with Merbok brought heavy squally showers and thunderstorms to Hong Kong on 12 and 13 June. The rain was most intense on the morning of 13 June. Red Rainstorm Warning, Landslip Warning, Special Announcement on Flooding in the Northern New Territories and Thunderstorm Warning were issued by the Observatory that morning. More than 150 millimetres of rainfall were generally recorded over the territory during these two days, with rainfall in the urban areas exceeding 250 millimetres.

In Hong Kong, at least 10 people were injured during the passage of Merbok. There were more than 600 reports of fallen trees, 20 reports of flooding and two reports of landslide. The glass curtain wall of a commercial building in Sheung Wan cracked, and an aluminum window fell down from a building in To Kwa Wan, damaging two private cars. Traffic was seriously disrupted as many roads were flooded during the rainstorm on the morning of 13 June. A retaining wall at Tai Tam Road in Stanley collapsed under the heavy rain. About 300 hectares of farmland in the New Territories were affected. More than 500 flights were cancelled or delayed at the Hong Kong International Airport.

Information on the maximum wind, periods of strong and gale force winds, daily rainfall and maximum sea level reached in Hong Kong during the passage of Merbok is given in Tables 3.1.1 - 3.1.4 respectively. Figures 3.1.1 - 3.1.2 show respectively the track of Merbok and the rainfall distribution for Hong Kong. Figure 3.1.3 shows the winds recorded at various stations in Hong Kong. Figure 3.1.4 shows the traces of mean sea-level pressure recorded at the Hong Kong Observatory's Headquarters and Waglan Island. Figures 3.1.5 - 3.1.6 show respectively a satellite imagery and radar imageries of Merbok. Some damages caused by Merbok in Hong Kong are illustrated in Figure 3.1.7.

表 3.1.1　在苗柏影響下，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 3.1.1　Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations when the tropical cyclone warning signals for Merbok 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)	東北偏東	ENE	68	12/6	15:50	東	E	31	12/6	14:00
中環碼頭	Central Pier	東北	NE	81	12/6	18:12	西北偏西	WNW	51	12/6	22:00
長洲	Cheung Chau	西北偏西	WNW	92	12/6	23:08	西北偏西	WNW	58	13/6	00:00
長洲泳灘	Cheung Chau Beach	西南	SW	79	13/6	06:10	東北	NE	51	12/6	16:00
青洲	Green Island	西南偏南	SSW	96	13/6	08:21	西北偏北	NNW	63	12/6	22:00
							西南	SW	63	13/6	07:00
香港國際機場	Hong Kong International Airport	西南	SW	79	13/6	06:04	西北	NW	51	12/6	23:00
啟德	Kai Tak	西南偏西	WSW	85	13/6	06:16	西	W	41	13/6	00:00
京士柏	King's Park	北	N	77	12/6	20:30	西北偏西	WNW	30	13/6	00:00
流浮山	Lau Fau Shan	西北	NW	75	12/6	23:34	西北偏北	NNW	52	12/6	22:00
昂坪	Ngong Ping	西南偏西	WSW	110	13/6	05:38	西南偏西	WSW	77	13/6	06:00
北角	North Point	西南偏西	WSW	96	13/6	05:18	西	W	59	13/6	00:00
坪洲	Peng Chau	西北	NW	83	12/6	21:16	西北	NW	49	12/6	22:00
平洲	Ping Chau	西	W	68	13/6	00:20	西	W	36	13/6	01:00
西貢	Sai Kung	東北偏北	NNE	99	12/6	20:34	北	N	49	12/6	21:00
沙洲	Sha Chau	北	N	79	12/6	19:54	北	N	58	12/6	20:00
沙田	Sha Tin	西南	SW	59	13/6	04:20	北	N	23	12/6	21:00
							西南	SW	23	13/6	07:00
九龍天星碼頭	Star Ferry (Kowloon)	西	W	77	12/6	23:38	西	W	59	13/6	00:00
打鼓嶺	Ta Kwu Ling	西	W	54	12/6	23:41	西北偏西	WNW	22	13/6	00:00
大美督	Tai Mei Tuk	東北偏北	NNE	103	12/6	20:21	東北偏北	NNE	54	12/6	21:00
大帽山	Tai Mo Shan	西北	NW	124	12/6	23:10	西	W	77	13/6	02:00
大埔滘	Tai Po Kau	西北偏西	WNW	75	12/6	23:24	西北偏西	WNW	40	12/6	23:00
塔門	Tap Mun	西	W	94	12/6	23:16	西	W	58	13/6	00:00
大老山	Tate's Cairn	東北偏北	NNE	131	12/6	20:14	北	N	85	12/6	21:00
將軍澳	Tseung Kwan O	東北偏北	NNE	68	12/6	18:58	西北偏北	NNW	23	12/6	21:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	西北偏北	NNW	65	12/6	20:59	西北	NW	31	12/6	21:00
屯門政府合署	Tuen Mun Government Offices	西北偏西	WNW	72	13/6	00:24	西北偏西	WNW	25	13/6	01:00
橫瀾島	Waglan Island	北	N	113	12/6	19:53	東北偏北	NNE	87	12/6	20:00
濕地公園	Wetland Park	西北	NW	52	12/6	23:34	西北	NW	22	13/6	00:00
黃竹坑	Wong Chuk Hang	西	W	77	12/6	21:35	西	W	31	12/6	22:00

沙螺灣及石崗 - 沒有資料　Sha Lo Wan and Shek Kong - data not available

表 3.1.2　在苗柏影響下，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及烈風程度的時段

Table 3.1.2　Periods during which sustained strong and gale force winds were attained at the eight reference anemometers in the tropical cyclone warning system when tropical cyclone warning signals for Merbok 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		最初達到烈風#時間 Start time when gale force wind speed# was attained		最後達到烈風#時間 End time when gale force wind speed# was attained	
		日期/月份 Date/Month	時間 Time	日期/月份 Date/Month	時間 Time	日期/月份 Date/Month	時間 Time	日期/月份 Date/Month	時間 Time
長洲	Cheung Chau	12/6	16:30	13/6	10:09	12/6	23:08	12/6	23:23
香港國際機場	Hong Kong International Airport	12/6	18:56	13/6	06:52	-			
啟德	Kai Tak	12/6	21:01	12/6	23:58	-			
流浮山	Lau Fau Shan	12/6	19:40	13/6	06:23	-			
西貢	Sai Kung	12/6	12:43	12/6	21:46	-			

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 Sha Tin, Ta Kwu Ling and Tsing Yi Shell Oil Depot.

- 未達到指定的風速
- not attaining the specified wind speed

* 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

十分鐘平均風速達每小時 63-87 公里
10-minute mean wind speed of 63-87 km/h

註:　本表列出持續風力達到強風及烈風程度的起始及終結時間。其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 or gale force winds. Winds might fluctuate above or below the specified wind speeds in between the times indicated.

表 3.1.3　苗柏掠過期間，香港天文台總部及其他各站所錄得的日雨量
Table 3.1.3　Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Merbok

站 (參閱圖 3.1.2) Station (See Fig. 3.1.2)			六月十一日 11 June	六月十二日 12 June	六月十三日 13 June	總雨量 (毫米) Total (mm)
香港天文台 Hong Kong Observatory			微量 Trace	37.7	219.4	257.1
香港國際機場 Hong Kong International Airport (HKA)			0.0	11.0	71.0	82.0
長洲 Cheung Chau (CCH)			0.0	7.0	118.0	125.0
H23	香港仔	Aberdeen	0.0	42.0	171.0	213.0
N05	粉嶺	Fanling	0.0	26.5	173.0	199.5
N13	糧船灣	High Island	0.0	35.0	165.0	200.0
K04	佐敦谷	Jordan Valley	0.0	61.0	213.5	274.5
N06	葵涌	Kwai Chung	0.0	54.0	186.0	240.0
H12	半山區	Mid Levels	0.0	38.0	260.0	298.0
N09	沙田	Sha Tin	0.0	46.0	150.0	196.0
H19	筲箕灣	Shau Kei Wan	0.0	42.0	243.0	285.0
SEK	石崗	Shek Kong	0.0	36.0	125.5	161.5
K06	蘇屋邨	So Uk Estate	0.0	52.5	197.0	249.5
R31	大美督	Tai Mei Tuk	[0.0]	41.5	159.5	[201.0]
R21	踏石角	Tap Shek Kok	[0.0]	23.5	92.5	[116.0]
TMR	屯門水庫	Tuen Mun Reservoir	[0.0]	24.5	[126.9]	[151.4]
N17	東涌	Tung Chung	0.0	10.5	109.0	119.5

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

表 3.1.4　苗柏掠過期間，香港各潮汐站所錄得的最高潮位及最大風暴潮
Table 3.1.4　Times and heights of the maximum sea level and the maximum storm surge recorded at tide stations in Hong Kong during the passage of Merbok

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	2.35	12/6	10:12	0.24	12/6	14:10
石壁	Shek Pik	2.57	12/6	10:06	0.28	12/6	10:09
大埔滘	Tai Po Kau	2.28	12/6	11:46	0.55	12/6	15:19
大廟灣	Tai Miu Wan	2.36	12/6	10:35	0.38	12/6	19:44
尖鼻咀	Tsim Bei Tsui	2.86	12/6	11:13	0.45	13/6	07:44
橫瀾島	Waglan Island	2.42	12/6	09:29	0.29	12/6	19:59

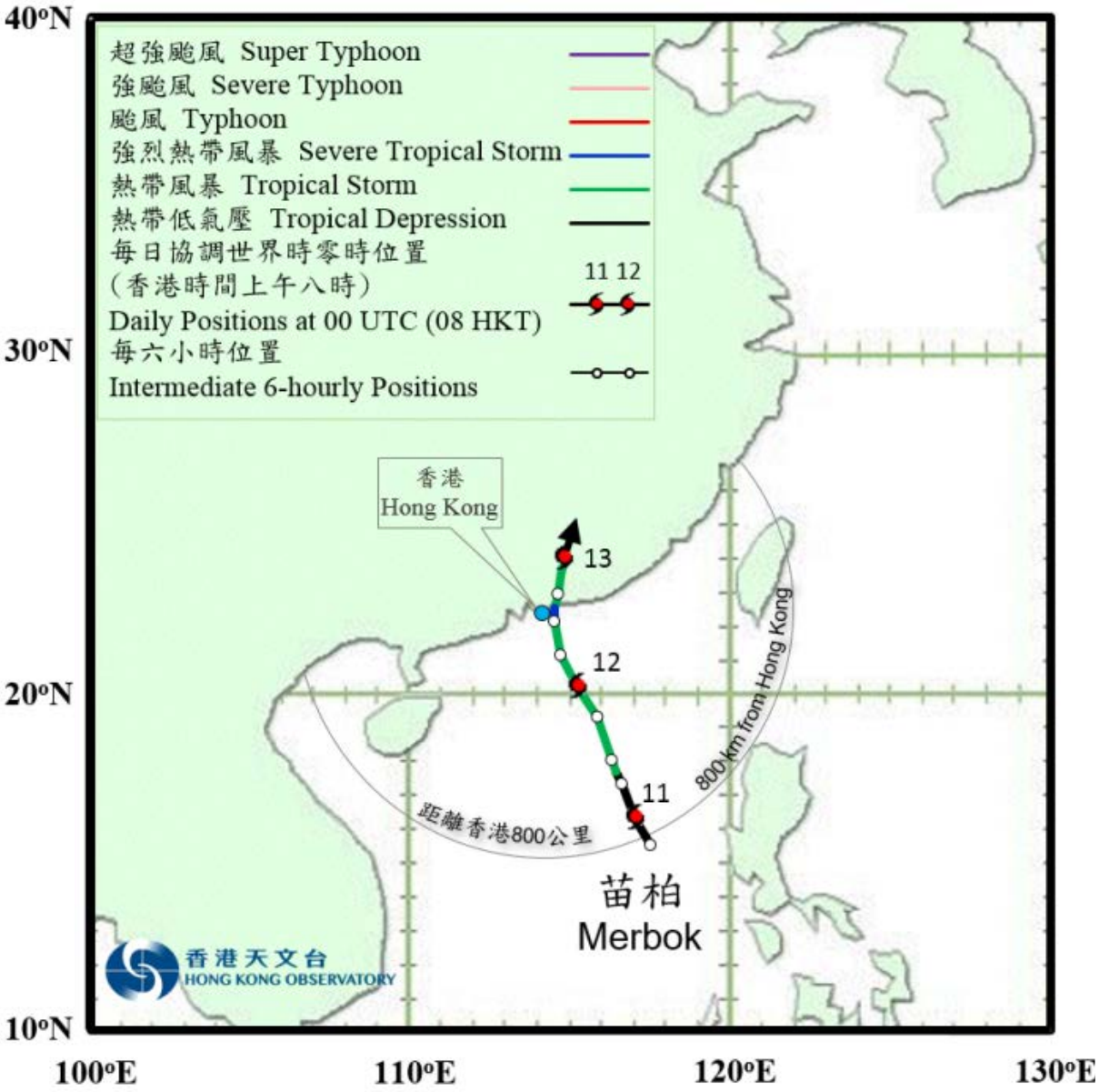

圖 3.1.1a　　二零一七年六月十一日至十三日苗柏的路徑圖。

Figure 3.1.1a　　Track of the Merbok on 11 – 13 June 2017.

圖 3.1.1b　　苗柏接近香港時的路徑圖。

Figure 3.1.1b　　Track of Merbok near Hong Kong.

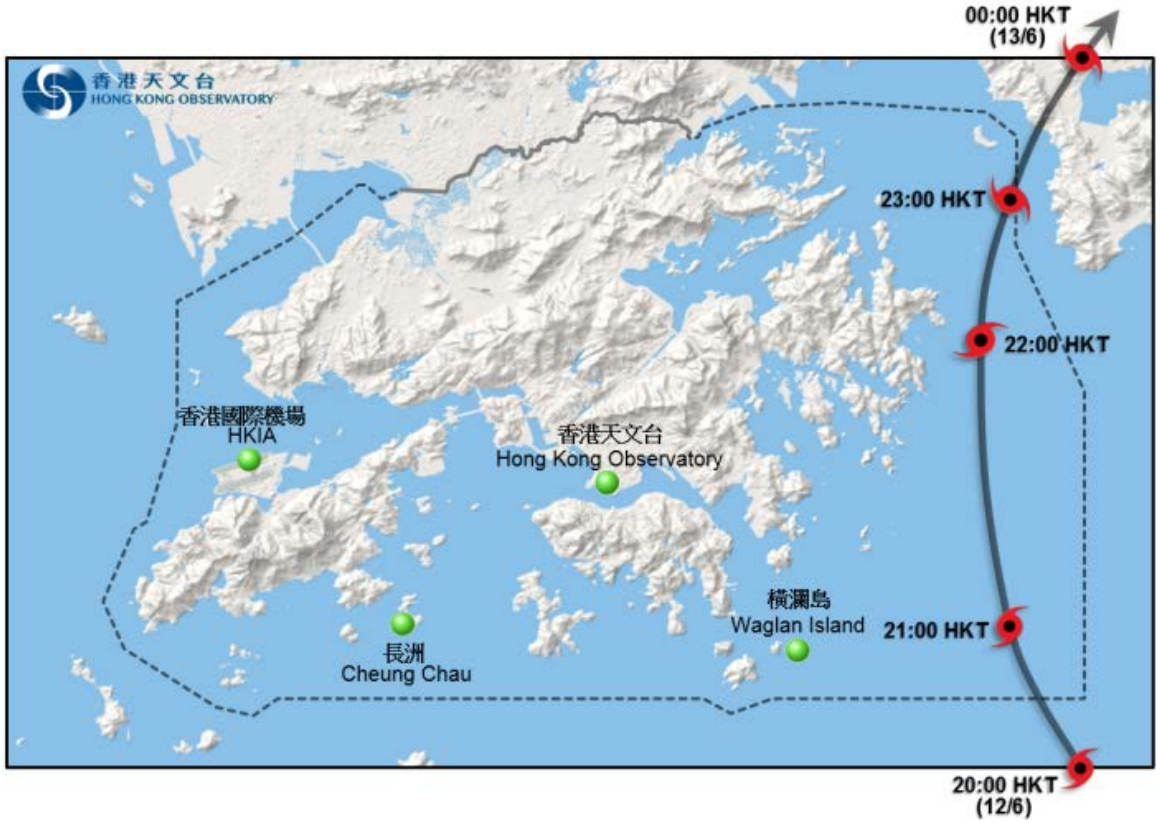

圖 3.1.1c　　苗柏橫過香港時的路徑圖。

Figure 3.1.1c　　Track of Merbok moving across Hong Kong.

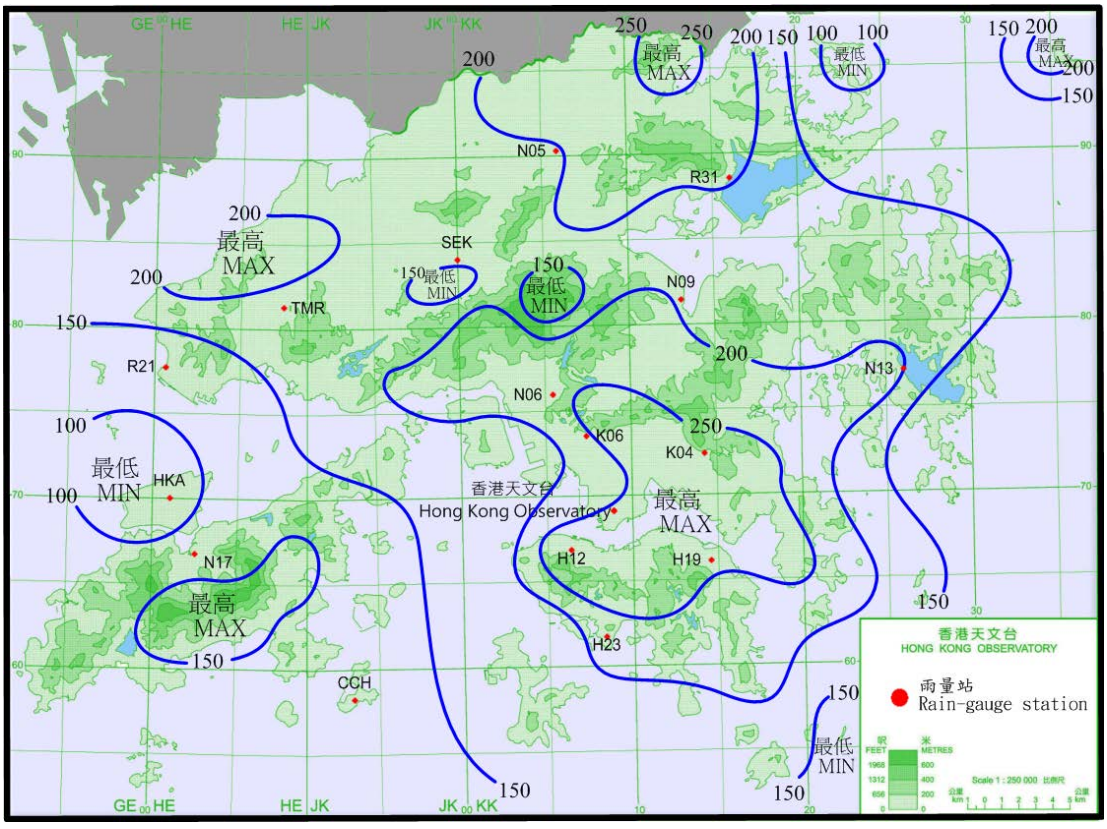

圖 3.1.2　　二零一七年六月十一日至十三日的雨量分佈(等雨量線單位為毫米)。

Figure 3.1.2　Rainfall distribution on 11 – 13 June 2017 (isohyets are in millimetres).

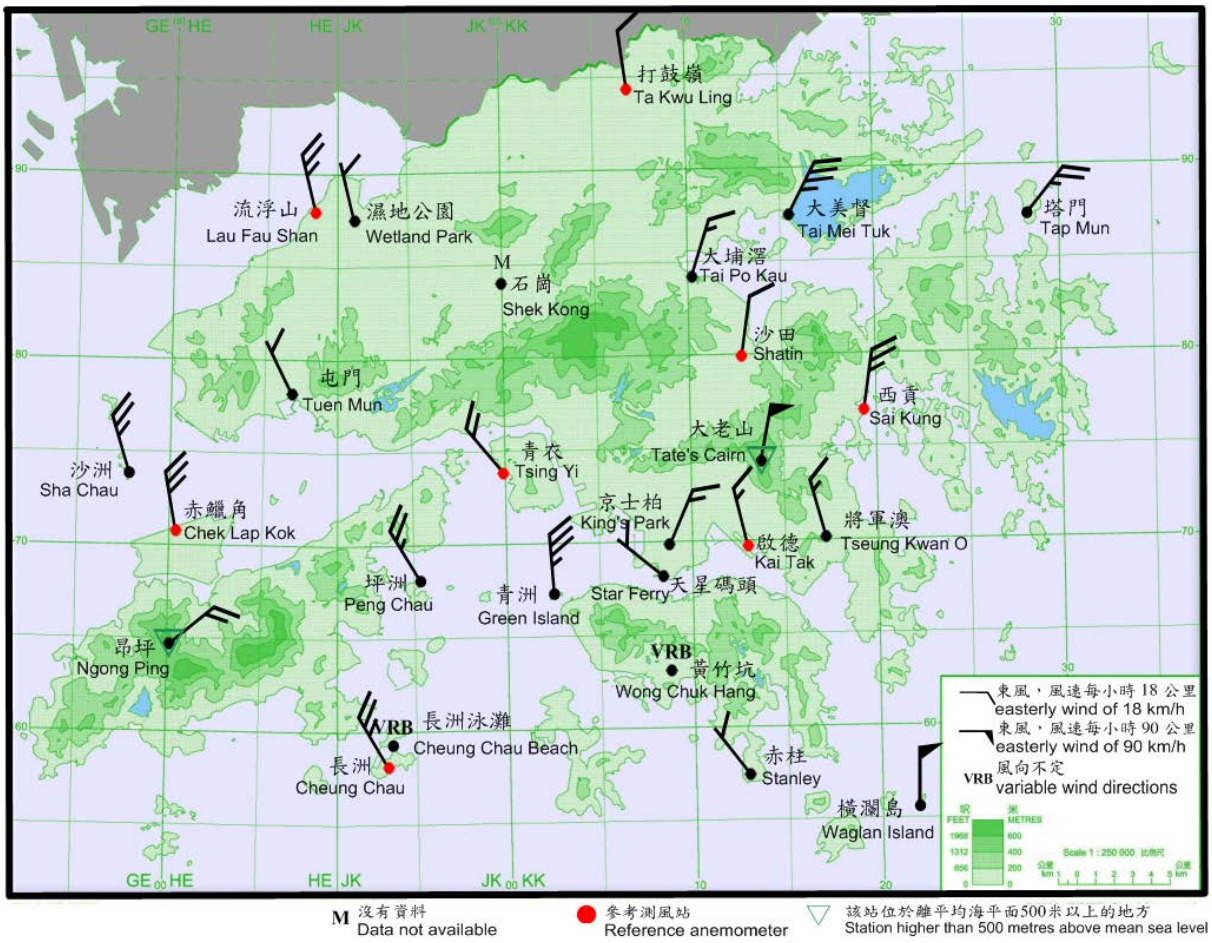

圖 3.1.3a　二零一七年六月十二日下午 8 時 20 分香港各站錄得的十分鐘平均風向和風速。當時橫瀾島及大老山的風力達到暴風程度。

Figure 3.1.3a　10-minute mean wind direction and speed recorded at various stations in Hong Kong at 8:20 p.m. on 12 June 2017. Winds at Waglan Island and Tate's Cairn reached storm force at the time.

註：　黃竹坑及長洲泳灘當時錄得的十分鐘平均風速分別為每小時 19 及 14 公里。

Note:　The 10-minute mean wind speeds recorded at the time at Wong Chuk Hang and Cheung Chau Beach were 19 and 14 km/h respectively.

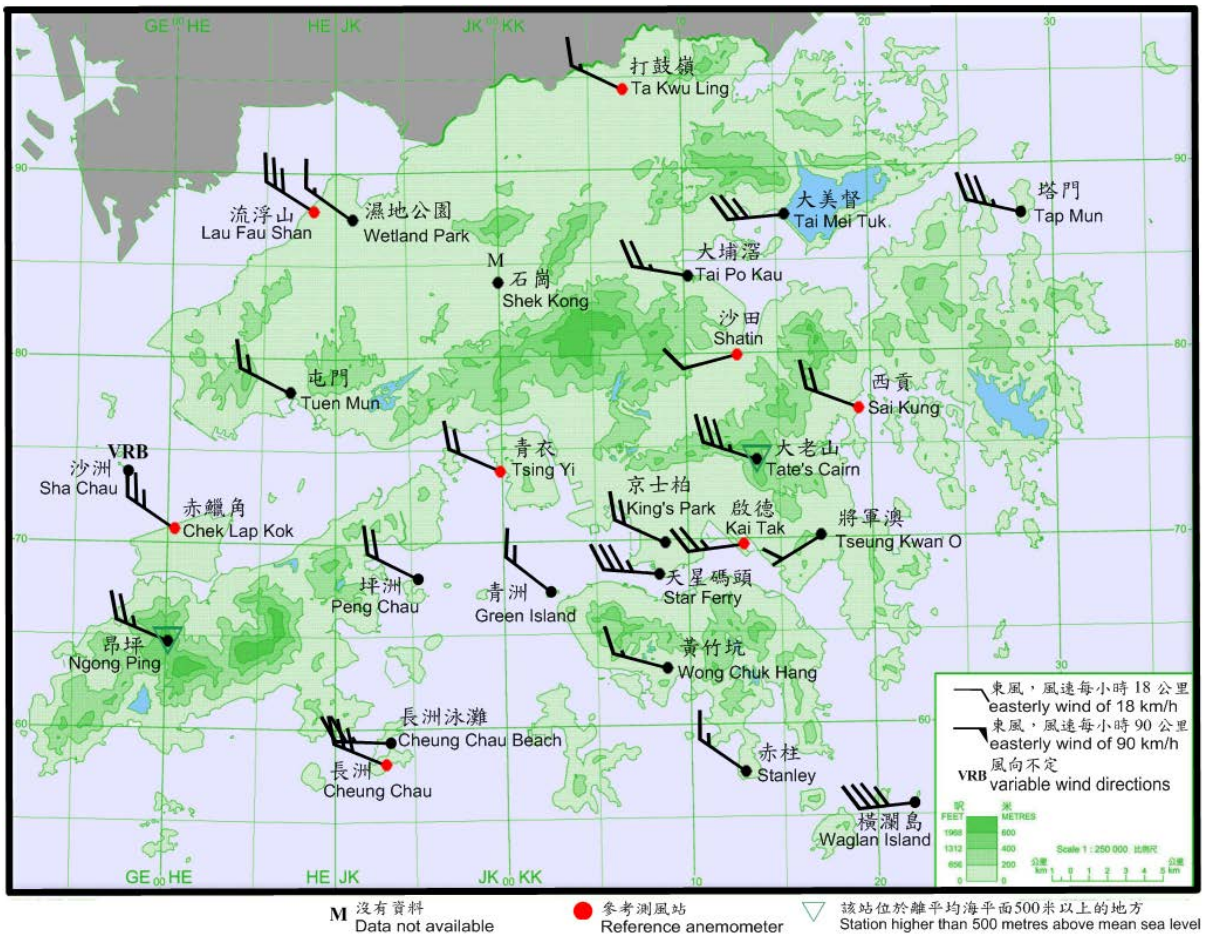

圖 3.1.3b　二零一七年六月十二日下午 11 時 40 分香港各站錄得的十分鐘平均風向和風速。當時九龍天星碼頭及橫瀾島的風力達到烈風程度。

Figure 3.1.3b　10-minute mean wind direction and speed recorded at various stations in Hong Kong at 11:40 p.m. on 12 June 2017. Winds at Star Ferry (Kowloon) and Waglan Island reached gale force at the time.

註：　沙洲當時錄得的十分鐘平均風速為每小時 19 公里。

Note:　The 10-minute mean wind speed recorded at the time at Sha Chau was 19 km/h.

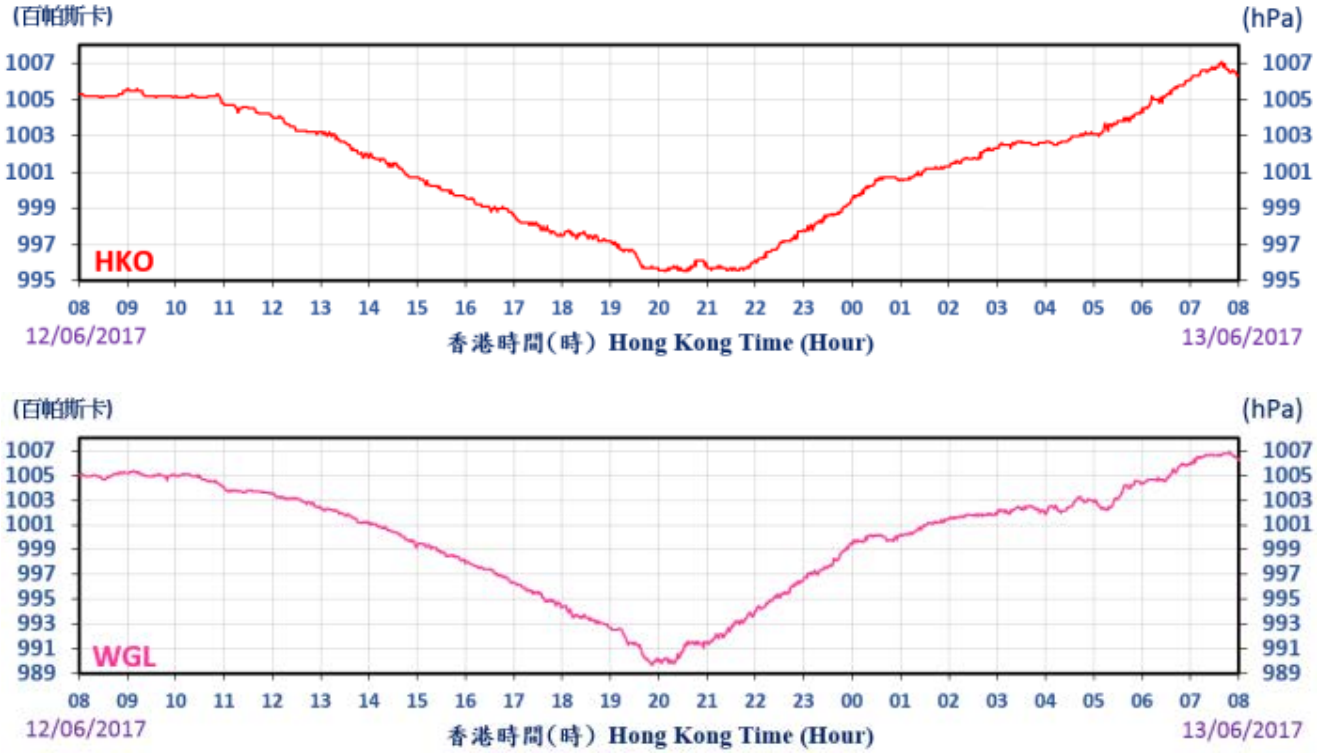

圖 3.1.4　二零一七年六月十二日至十三日天文台總部(上圖)及橫瀾島(下圖)錄得的海平面氣壓。

Figure 3.1.4　Traces of mean sea-level pressure recorded at the Observatory Headquarters (top panel) and Waglan Island (bottom panel) between 12 and 13 June 2017.

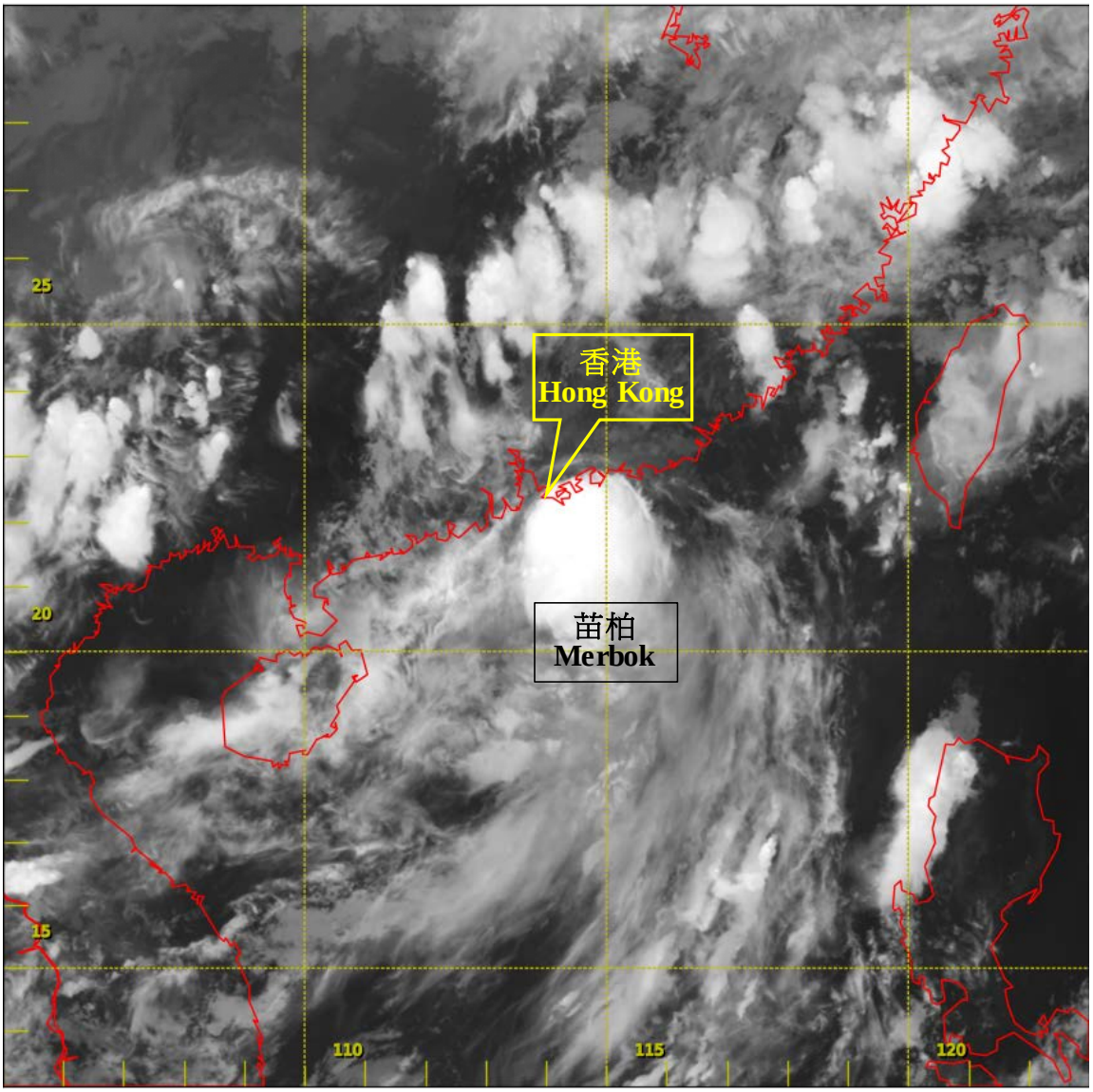

圖 3.1.5　二零一七年六月十二日下午 8 時左右的紅外線衛星圖片，當時苗柏達到其最高強度，中心附近最高持續風速估計為每小時 105 公里。

Figure 3.1.5　Infra-red satellite imagery around 8 p.m. on 12 June 2017, when Merbok was at peak intensity with estimated maximum sustained winds of 105 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 the Himawari-8 (H-8) of Japan Meteorological Agency (JMA).]

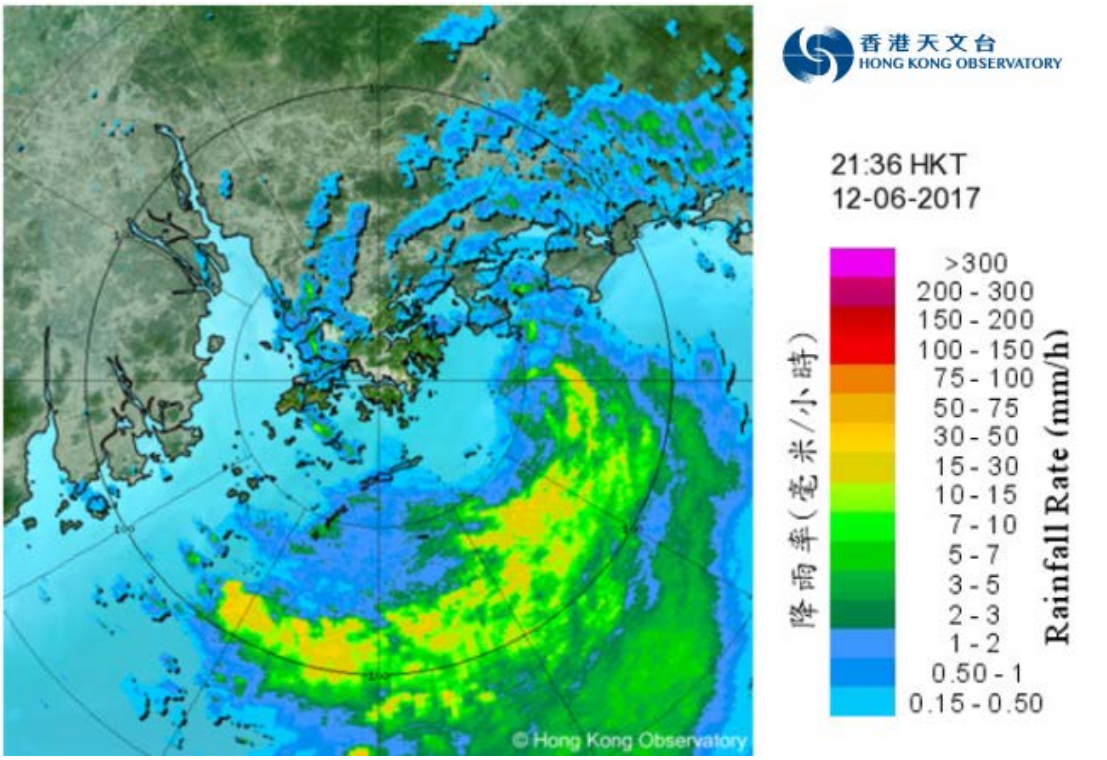

圖 3.1.6a　二零一七年六月十二日下午 9 時 36 分的雷達回波圖像，當時苗柏最接近香港。

Figure 3.1.6a　Image of radar echoes at 9:36 p.m. on 12 June 2017, when Merbok was closest to the territory.

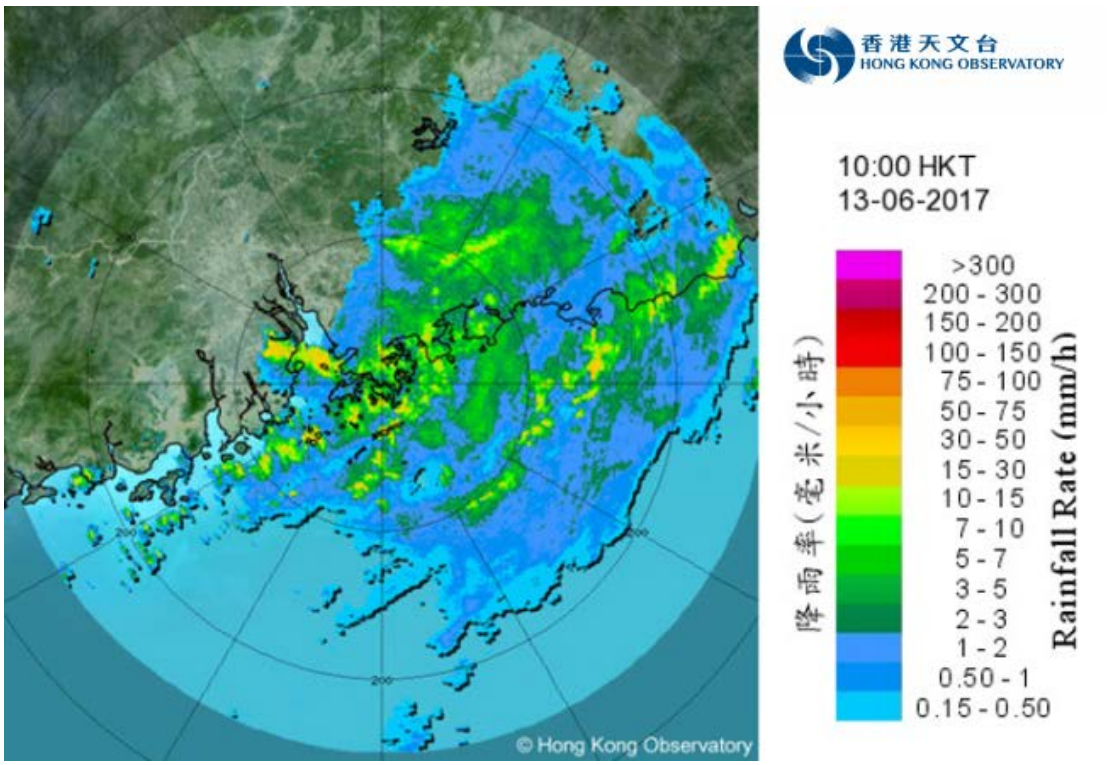

圖 3.1.6b　二零一七年六月十三日上午 10 時的雷達回波圖像。苗柏為香港帶來暴雨。

Figure 3.1.6b　Image of radar echoes at 10 a.m. on 13 June 2017, as rainstorms associated with Merbok affected Hong Kong.

圖 3.1.7　赤柱大潭道一幅護土牆在暴雨下倒塌。(照片由土力工程處及土木工程拓展署提供)

Figure 3.1.7　A retaining wall at Tai Tam Road in Stanley collapsed under the heavy rain. (courtesy of the Geotechnical Engineering Office and the Civil Engineering and Development Department)