

### 3.3 超強颱風天鴿 (1713)：二零一七年八月二十日至二十四日

天鴿是二零一七年第三個影響香港的熱帶氣旋，天文台需要發出十號颶風信號，是自二零一二年強颱風韋森特襲港以來再一次發出最高級別的熱帶氣旋警告信號。由於南海北部海水溫度較正常偏高，天鴿橫過南海北部期間顯著增強，在香港以南水域更短暫發展為超強颱風，是自一九七九年荷貝以來再一次有超強颱風引致天文台發出八號或以上的熱帶氣旋警告信號。

熱帶低氣壓天鴿於八月二十日晚上在高雄之東南偏東約 740 公里的北太平洋西部上形成，大致向偏西方向移動，橫過呂宋海峽，八月二十二日進入南海東北部，並增強為颱風及採取西北偏西路徑移向廣東沿岸。八月二十三日天鴿趨向珠江口一帶及進一步增強，早上在香港以南海域發展成為超強颱風，達到其最高強度，中心附近最高持續風速估計為每小時 185 公里。正午過後天鴿在澳門及珠海附近沿岸登陸，移入廣東西部及逐漸減弱。翌日天鴿橫過廣西，晚上在雲南減弱為一個低壓區。

天鴿為珠江口沿岸帶來嚴重的風暴潮，多處錄得有紀錄以來的最高潮位，當中珠海站錄得風暴潮 2.79 米，而最高潮位則為 6.14 米。珠海沿海地區包括幾個地下停車場被海水淹浸，全市電力及食水供應不穩定。多艘貨船在香港西南約 30 公里的水域擱淺，39 名船員獲救。天鴿為澳門帶來破壞性的風力及風暴潮，廣泛地區出現嚴重破壞及水浸，造成至少十人死亡，超過 240 人受傷，直接經濟損失超過 83 億元澳門幣。媽閣站最高潮位升至 5.58 米，是澳門自一九二五年有紀錄以來的最高潮位。電力及食水供應亦受到影響。天鴿在廣東、廣西、福建、貴州及雲南至少造成 15 人死亡，一人失蹤，約有 74 萬人受災，超過 6,500 間房屋倒塌，直接經濟損失超過 272 億元人民幣。

香港天文台在八月二十二日早上 8 時 40 分發出一號戒備信號，當時天鴿集結在香港之東南偏東約 660 公里。日間本港吹輕微至和緩的偏北風。受高溫觸發的狂風雷暴下午影響本港多處地區。隨著天鴿移近廣東沿岸，天文台在下午 6 時 20 分發出三號強風信號，當時天鴿位於香港之東南偏東約 410 公里。翌日凌晨本港風勢逐漸增強，吹清勁至強風程度的偏北風，高地吹烈風，天文台在上午 5 時 20 分發出八號東北烈風或暴風信號，當時天鴿集結在香港之東南約 160 公里。其後本港風勢迅速增強，多處地方吹東北烈風，離岸及高地吹暴風。由於預料天鴿將會正面吹襲珠江口，天文台在上午 8 時 10 分發出九號烈風或暴風風力增強信號，當時天鴿已移至香港天文台之東南偏南約 100 公里。早上香港風力進一步

增強，天文台在上午 9 時 10 分發出十號颶風信號，當時天鴿位於天文台以南約 70 公里。本港風力普遍達到烈風至暴風程度，南部地區及高地則持續受到颶風吹襲。天鴿在早上 10 時左右最接近香港，位於香港天文台之西南偏南只有約 60 公里。天鴿在香港西面登陸，本港風向由東北逐漸轉為東南，風力開始減弱，天文台在下午 2 時 10 分改發八號東南烈風或暴風信號。隨著天鴿減弱及遠離，天文台分別在下午 5 時 10 分及下午 6 時 20 分改發三號強風信號及一號戒備信號。晚間天鴿進一步移入內陸，天文台在晚上 8 時 40 分取消所有熱帶氣旋警告信號。

天鴿所帶來的風暴潮令本港水位普遍升高一至兩米左右，適逢天文大潮及漲潮(維多利亞港內鰂魚涌當日早上的最高天文潮約為 2.4 米)，疊加效應導致本港多處低窪地區被海水淹浸。鰂魚涌的潮位最高升至 3.57 米(海圖基準面以上)，是自 1954 年有記錄以來的第二高，僅次於一九六二年超強颱風溫黛襲港期間錄得的最高潮位紀錄 3.96 米(海圖基準面以上)。尖鼻咀錄得自一九七四年有記錄以來的最高潮位 4.56 米(海圖基準面以上)。天鴿掠過期間香港各潮汐站所錄得的最高潮位可參考圖 3.3.7。

八月二十三日天鴿吹襲香港期間，橫瀾島、長洲、大美督及北角錄得的最高每小時平均風速分別為 130、124、94 及 85 公里，最高陣風則分別為每小時 193、171、140 及 137 公里。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	986.3	23/8	上午 9 時 39 分
香港國際機場	982.9	23/8	上午 10 時 57 分
京士柏	986.6	23/8	上午 9 時 40 分
坪洲	983.6	23/8	上午 9 時 52 分
打鼓嶺	990.9	23/8	上午 10 時 01 分
大埔	990.4	23/8	上午 9 時 20 分
沙田	989.6	23/8	上午 9 時 19 分
上水	990.1	23/8	上午 10 時 25 分
流浮山	988.3	23/8	上午 10 時 18 分
長洲	980.1	23/8	上午 10 時 33 分
橫瀾島	982.0	23/8	上午 9 時 34 分

受天鴿前沿下沉氣流所影響，八月二十二日本港天氣悶熱及有煙霞，多處地區的氣溫上升至 37 度或以上，而當天下午二時左右天文台的氣溫更高達 36.6 度，創下有記錄以來的最高氣溫。而高溫觸發的強烈對流在下午稍後為本港帶來大驟雨及狂風雷暴。在天鴿環流的影響下，八月二十三日本港有狂風大驟雨及雷暴，天文台在早上曾發出黃色暴雨警告。八月二十四日天氣好轉，日間部分時間有陽光。這三天期間，本港普遍錄得超過 60 毫米雨量。

天鴿吹襲香港期間，本港最少有 129 人受傷，另有超過 5 300 宗塌樹報告、多宗高空墜物意外、一宗山泥傾瀉報告及多處水浸報告。兩名警務人員在新蒲崗處理塌樹時被掉落的樹枝擊傷頭部，一人在觀塘被從高處墮下的晾衫竹枝擊傷。紅磡一幢住宅大廈有吊船在強風下鬆脫並猛撼撞毀數戶單位的玻璃窗。灣仔及中環分別有商業大廈的玻璃幕牆被吹毀，觀塘及荃灣有棚架倒塌。大嶼山愉景灣有貨船在岸邊擱淺，船上十人安全撤離。

天鴿所觸發的風暴潮導致本港多處沿岸地區出現嚴重水浸及破壞，當中包括大澳、石壁、梅窩、長洲、杏花邨、小西灣、鯉魚門、將軍澳、沙田、大埔、西貢、元朗及流浮山等多個地區。據報大澳的水浸較二零零八年黑格比更為嚴重，水浸預警系統在風暴期間啟動，多名居民需要疏散。鯉魚門一帶亦出現嚴重水浸，海水湧入多間村屋及店舖，多名村民被水圍困，需要消防員協助疏散。杏花邨海濱長廊一帶嚴重水浸，海水湧入邨內，有地下停車場被海水淹浸。海水亦湧入小西灣運動場。沙田城門河、吐露港沿岸及大埔林村河一帶的單車徑及行人隧道被淹浸。西貢、流浮山及大埔亦有多間村屋遭受水浸。大埔有多間村屋的電力供應曾受影響。將軍澳海濱長廊被海浪沖擊受損。元朗明渠及山貝河暴漲，附近一帶水浸。石壁監獄懲教職員宿舍亦出現嚴重水浸情況，有車輛被海水沖走。因光纖電纜受損，長洲及坪洲的對外通訊服務受到影響。

天鴿亦嚴重影響本港的海陸空交通，港鐵所有架空路段的鐵路服務曾一度暫停，多區道路因強風、塌樹或水浸需要封閉。多個渡輪碼頭設施出現嚴重損毀，影響渡輪復航。香港國際機場有至少 480 班航班取消，九班航班需要轉飛其它地方。

表 3.3.1 - 3.3.4 分別是天鴿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 3.3.1 - 3.3.2 分別為天鴿的路徑圖和天鴿中心附近最高持續風速。圖 3.3.3 - 3.3.4 分別是本港的雨量分佈圖及香港各站錄得的風向和風速。圖 3.3.5 顯示長洲、香港國際機場及北

角錄得的風速。圖 3.3.6 顯示天文台總部、長洲及香港國際機場錄得的海平面氣壓。圖 3.3.7 顯示各潮汐站錄得的最高潮位及水浸報告。圖 3.3.8 顯示鰂魚涌、大埔滘及尖鼻咀錄得的潮位及風暴潮。圖 3.3.9 - 3.3.10 分別為天鴿的衛星及雷達圖像<sup>(i)</sup>。圖 3.3.11 是雲頂高度疊加閃電位置的圖像。天鴿在香港造成的破壞可參見圖 3.3.12 - 3.3.20<sup>(ii)</sup>。而天鴿在澳門造成的破壞可參見圖 3.3.21 - 3.3.23。

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<sup>i</sup> 請參看天文台網頁有關天鴿的衛星及雷達圖像動畫  
(<https://www.hko.gov.hk/tc/informtc/hato17/hato.htm>)。

<sup>ii</sup> 請參看天文台網頁有關天鴿為香港帶來的風暴潮的短片  
(<https://www.hko.gov.hk/tc/informtc/hato17/hato.htm>)。

### 3.3 Super Typhoon Hato (1713): 20 – 24 August 2017

Hato was the third tropical cyclone affecting Hong Kong in 2017. The highest tropical cyclone warning, No.10 Hurricane Signal, was issued for the first time since Severe Typhoon Vicente hitting Hong Kong in July 2012. Hato intensified significantly as it traversed the northern part of the South China Sea, momentarily attaining super typhoon intensity over the sea areas south of Hong Kong and the first time a super typhoon necessitating the issuance of tropical cyclone warning signals No.8 or above since Hope in 1979.

Hato formed as a tropical depression over the western North Pacific about 740 km east-southeast of Gaoxiong on the night of 20 August. It moved generally westwards across the Luzon Strait and entered the northeastern part of the South China Sea on 22 August, intensifying into a typhoon and tracking west-northwest towards the coast of Guangdong. During its approach towards the Pearl River estuary on 23 August, Hato intensified further and became a super typhoon that morning over the sea areas south of Hong Kong, reaching its peak intensity with an estimated sustained wind of 185 km/h near its centre. After making landfall over the coast near Macao and Zhuhai shortly after noon time, Hato entered western Guangdong and gradually weakened. It moved across Guangxi the next day and degenerated into an area of low pressure over Yunnan at night.

Hato brought severe storm surge to the coast of Pearl River estuary. Record-high sea levels were recorded at many places. A maximum storm surge of 2.79 m and a maximum sea level of 6.14 m were recorded at Zhuhai station. The coastal areas in Zhuhai including some underground car parks were flooded by sea water. Electricity and water supply in the city became unstable. A number of vessels ran aground about 30 km southwest of Hong Kong and 39 crew members were rescued. Hato brought damaging winds and storm surge to Macao. Extensive areas of Macao suffered damage and were seriously flooded, resulting in at least ten deaths and more than 240 injuries. The direct economic loss exceeded 8.3 billion MOP. A maximum sea level of 5.58 metres was recorded in A-Ma station, a record high in Macao since records began in 1925. Electricity and water supplies were also affected. In Guangdong, Guangxi, Fujian, Guizhou and Yunnan, there were at least 15 deaths and one missing during the passage of Hato. Around 740 000 people were affected and over 6 500 houses collapsed, with direct economic loss exceeding 27.2 billion RMB.

The Hong Kong Observatory issued the No.1 Standby Signal at 8:40 a.m. on 22 August when Hato was about 660 km east-southeast of the territory. Local winds were light to moderate northerlies during the day. Squally thunderstorms triggered by high temperatures affected many places in the territory during the afternoon. As Hato edged closer to the coast of Guangdong, the No.3 Strong Wind Signal was issued at 6:20 p.m. when Hato was about 410 km east-southeast of Hong Kong. Local winds strengthened gradually in the small hours of 23 August, becoming fresh to strong northerlies, reaching gale force on high ground. The Observatory issued the No.8 Northeast Gale or Storm Signal at 5:20 a.m. when Hato was about 160 km southeast of the territory. Local winds strengthened rapidly afterwards, with northeasterly gales in many places and reaching storm force offshore and on high ground. With Hato expected to make a direct hit over the Pearl River estuary, the No.9 Increasing Gale or Storm Signal was issued at 8:10 a.m. when Hato was about 100 km south-southeast of the Hong Kong Observatory. Local winds strengthened further that morning and the No.10 Hurricane Signal was issued at 9:10 a.m. when Hato was about 70 km south of the Hong Kong Observatory. Gale to storm force winds generally affected Hong Kong, with winds

persistently reaching hurricane force over the southern part of the territory and on high ground. Hato came closest to Hong Kong around 10 a.m. that morning with its centre passing only about 60 km south-southwest of the Hong Kong Observatory. As Hato made landfall to the west of Hong Kong, local winds gradually veered from northeasterly to southeasterly and started to subside. The No.8 Southeast Gale or Storm Signal was then issued at 2:10 p.m. With Hato weakening and moving away, the No.3 Strong Wind Signal and No.1 Standby Signal were issued at 5:10 p.m. and 6:20 p.m. respectively. Hato moved further inland during the night and all tropical cyclone warning signals were cancelled at 8:40 p.m.

The storm surge brought by Hato raised the water level in Hong Kong generally by about one to two metres. Coinciding with the high water of the astronomical tide (the astronomical high tide was about 2.4 m at Quarry Bay in the Victoria Harbour that morning), the aggregated effect resulted in the inundation of many low-lying areas in Hong Kong by sea water. The water level at Quarry Bay reached a maximum of 3.57 mCD (metres above Chart Datum), the second highest since records began in 1954 and only lower than the record high of 3.96 mCD set by Super Typhoon Wanda in 1962. A maximum water level of 4.56 mCD was recorded in Tsim Bei Tsui, the highest since records began in 1974. For the maximum sea levels recorded at various tide stations in Hong Kong during the passage of Hato, please refer to Figure 3.3.7.

As Hato battered Hong Kong on 23 August, maximum hourly mean winds of 130, 124, 94 and 85 km/h and maximum gusts of 193, 171, 140 and 137 km/h were recorded at Waglan Island, Cheung Chau, Tai Mei Tuk and North Point respectively. 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	986.3	23/8	9:39 a.m.
Hong Kong International Airport	982.9	23/8	10:57 a.m.
King's Park	986.6	23/8	9:40 a.m.
Peng Chau	983.6	23/8	9:52 a.m.
Ta Kwu Ling	990.9	23/8	10:01 a.m.
Tai Po	990.4	23/8	9:20 a.m.
Shatin	989.6	23/8	9:19 a.m.
Sheung Shui	990.1	23/8	10:25 a.m.
Lau Fau Shan	988.3	23/8	10:18 a.m.
Cheung Chau	980.1	23/8	10:33 a.m.
Waglan Island	982.0	23/8	9:34 a.m.

The subsidence effect ahead of Hato's circulation brought hazy skies and oppressive heat to Hong Kong on 22 August, with temperatures in many places reaching 37 degrees or above. Temperature at the Hong Kong Observatory soared to an all-time record-breaking high of 36.6 degrees around 2 p.m. that day. Intense convection triggered by high temperatures brought heavy showers and squally thunderstorms to the territory later in the afternoon. Under the influence of Hato's circulation, there were heavy squally showers and thunderstorms on 23 August, and Amber Rainstorm Warning was issued by the Observatory

that morning. The weather improved with sunny periods during the day on 24 August. More than 60 mm of rainfall were recorded generally over Hong Kong during the 3-day period.

In Hong Kong, at least 129 people were injured during the passage of Hato. There were over 5 300 reports of fallen trees, many incidents of falling objects, one report of landslide as well as a number of flooding reports. Two police officers were hit on the head by falling branches near San Po Kong when clearing the fallen trees. One person was injured by a falling clothes-hanging pole in Kwun Tong. A suspended work platform at an apartment block in Hung Hom came loose under strong winds and rammed into the windows of several units of the building. Glass curtain walls of several commercial buildings in Wan Chai and Central were shattered. Some scaffolding in Kwun Tong and Tsueu Wan collapsed. A vessel ran aground near Discovery Bay in Lantau Island and ten crew members on board were taken to safety.

Storm surge induced by Hato resulted in serious flooding and damages in a number of coastal areas in Hong Kong, including Tai O, Shek Pik, Mui Wo, Cheung Chau, Heng Fa Chuen, Siu Sai Wan, Lei Yue Mun, Tseung Kwan O, Sha Tin, Tai Po, Sai Kung, Yuen Long and Lau Fau Shan. The flooding in Tai O was reported to be more damaging than that of Hagupit in 2008. The flood alert system for Tai O was activated and many residents were evacuated. Serious flooding also occurred in Lei Yue Mun, with sea water flowing into a number of village houses and shops, trapping many residents who had to be helped to safety by firemen. The Heng Fa Chuen promenade was inundated, with sea water flowing into the estate and its underground car park. Siu Sai Wan Sports Ground was also flooded by sea water. The cycle tracks and subways near Shing Mun River in Sha Tin, coastal area of Tolo Harbour, Lam Tsuen River in Tai Po were flooded, as well as a number of village houses in Sai Kung, Lau Fau Shan and Tai Po. Electricity supply to many village houses in Tai Po was interrupted. The waterfront at Tseung Kwan O was damaged by sea waves. The surge of water level in Yuen Long nullah and Shan Pui River resulted in flooding nearby. Shek Pik Prison Staff Quarters was also seriously flooded, with vehicles swept away by sea waters. External communication services in Cheung Chau and Peng Chau were affected as a result of damaged optical fibre cables.

Transportation services in Hong Kong were seriously affected by Hato. Train services along the open sections of MTR were once suspended. Many roads were closed due to strong winds, fallen trees or flooding. Resumption of ferry services was affected due to the damage of facilities at a number of ferry terminals. More than 480 flights were cancelled and nine flights were diverted 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 Hato is given in Tables 3.3.1 - 3.3.4 respectively. Figures 3.3.1 - 3.3.2 show respectively the track of Hato and the maximum sustained wind speed near the centre of Hato. Figures 3.3.3 - 3.3.4 are the rainfall distribution for Hong Kong and the winds recorded at various stations in Hong Kong respectively. Figure 3.3.5 shows traces of the wind speed recorded at Cheung Chau, Hong Kong International Airport and North Point. Figure 3.3.6 shows trace of mean sea-level pressure recorded at the Hong Kong Observatory's Headquarters, Cheung Chau and Hong Kong International Airport. Figure 3.3.7 shows the maximum sea level recorded at various tide stations in Hong Kong and flood reports. Figure 3.3.8 is the traces of sea level and storm surge recorded at Quarry Bay, Tai Po Kau and Tsim Bei Tsui. Figures 3.3.9 - 3.3.10 show respectively

a satellite imagery and a radar imagery of Hato<sup>(i)</sup>. Figure 3.3.11 is an image of cloud top height overlaid with lightning locations<sup>(ii)</sup>. Figures 3.3.12 - 3.3.20 are the damages brought by Hato in Hong Kong. Figures 3.3.21 - 3.3.23 are the damages brought by Hato to Macao.

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<sup>i</sup> The animation sequences of satellite and radar imageries are available on the Observatory's website at <https://www.hko.gov.hk/en/informtc/hato17/hato.htm>.

<sup>ii</sup> The videos of storm surge brought by Hato are available on the Observatory's website at <https://www.hko.gov.hk/en/informtc/hato17/hato.htm>.



表 3.3.1 本港各站在天鴿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 3.3.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations when the tropical cyclone warning signals for Hato 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	NE	139	23/8	09:06	東南	SE	87	23/8	11:00
中環碼頭	Central Pier	東	E	137	23/8	09:55	東	E	70	23/8	10:00
長洲	Cheung Chau	東南	SE	171	23/8	11:01	東南	SE	124	23/8	12:00
長洲泳灘	Cheung Chau Beach	東北偏東	ENE	193	23/8	10:15	東北	NE	121	23/8	10:00
香港國際機場	Hong Kong International Airport	東南偏東	ESE	144	23/8	11:55	東	E	90	23/8	11:00
啟德	Kai Tak	東北	NE	130	23/8	08:54	東南偏東	ESE	67	23/8	12:00
京士柏	King's Park	東南偏東	ESE	113	23/8	10:49	東南偏東	ESE	52	23/8	11:00
流浮山	Lau Fau Shan	東北偏北	NNE	112	23/8	08:55	北	N	65	23/8	09:00
昂坪	Ngong Ping	東	E	224	23/8	11:07	東北偏東	ENE	131	23/8	11:00
北角	North Point	東北偏東	ENE	137	23/8	09:49	東北偏東	ENE	85	23/8	10:00
坪洲	Peng Chau	東	E	151	23/8	10:53	東	E	96	23/8	11:00
平洲	Ping Chau	東北偏東	ENE	77	23/8	08:57	東北偏東	ENE	25	23/8	09:00
西貢	Sai Kung	東	E	112	23/8	10:00	東北	NE	70	23/8	10:00
沙洲	Sha Chau	東南偏南	SSE	137	23/8	12:21	東南偏東	ESE	88	23/8	12:00
沙田	Sha Tin	東北偏北	NNE	104	23/8	09:27	東南	SE	38	23/8	13:00
石崗	Shek Kong	東北	NE	106	23/8	09:52	東	E	45	23/8	12:00
九龍天星碼頭	Star Ferry (Kowloon)	東	E	112	23/8	09:54	東	E	59	23/8	11:00
打鼓嶺	Ta Kwu Ling	東北偏北	NNE	99	23/8	09:42	東北偏北	NNE	41	23/8	10:00
大美督	Tai Mei Tuk	東北偏東	ENE	140	23/8	10:20	東北偏東	ENE	94	23/8	10:00
		東	E				東	E	94	23/8	11:00
大帽山	Tai Mo Shan	東南偏東	ESE	196	23/8	11:22	東南	SE	90	23/8	13:00
大埔滘	Tai Po Kau	東南偏東	ESE	113	23/8	11:38	東	E	68	23/8	11:00
塔門*	Tap Mun*	東北偏東	ENE	122	23/8	09:22	東北偏東	ENE	94	23/8	10:00
		東北偏東	ENE	122	23/8	09:29					
大老山	Tate's Cairn	東北	NE	187	23/8	08:37	東北偏東	ENE	118	23/8	09:00
將軍澳	Tseung Kwan O	東北偏北	NNE	36	23/8	09:00	東北偏北	NNE	36	23/8	09:00
		東南偏東	ESE	36	23/8	11:04	東南偏東	ESE	36	23/8	12:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	東南偏東	ESE	106	23/8	10:40	東南偏東	ESE	43	23/8	12:00
屯門政府合署	Tuen Mun Government Offices	東南	SE	112	23/8	11:52	東南	SE	43	23/8	13:00
橫瀾島	Waglan Island	東	E	193	23/8	09:10	東北	NE	130	23/8	09:00
濕地公園	Wetland Park	東北	NE	76	23/8	09:57	東北偏東	ENE	38	23/8	11:00
黃竹坑	Wong Chuk Hang	東	E	117	23/8	10:00	東	E	43	23/8	11:00

\*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 anemometer station on the rooftop of Tap Mun Police Post is replaced by the new Tap Mun station on 6 July 2017.

青洲, 沙螺灣- 沒有資料 Green Island, Sha Lo Wan - data not available

表 3.3.2 在天鴿影響下，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 3.3.2 Periods during which sustained strong and gale force winds were attained at the eight reference anemometers when tropical cyclone warning signals for Hato were in force

站 (參閱圖 1.1) Station (See Fig. 1.1)		最初達到強風*		最後達到強風*		最初達到烈風#		最後達到烈風#	
		時間		時間		時間		時間	
		Start time when strong wind speed* was attained		End time when strong wind speed* was attained		Start time when gale force wind speed# was attained		End time when gale force wind speed# was attained	
		日期/月份	時間	日期/月份	時間	日期/月份	時間	日期/月份	時間
		Date/Month	Time	Date/Month	Time	Date/Month	Time	Date/Month	Time
長洲	Cheung Chau	23/8	05:13	23/8	16:51	23/8	07:33	23/8	13:45
香港國際機場	Hong Kong International Airport	22/8	16:11	23/8	15:26	23/8	08:41	23/8	13:32
啟德	Kai Tak	23/8	08:49	23/8	12:41	23/8	10:26	23/8	12:05
流浮山	Lau Fau Shan	23/8	06:33	23/8	14:55	23/8	08:24	23/8	10:36
西貢	Sai Kung	23/8	06:16	23/8	16:13	23/8	08:08	23/8	12:26
沙田	Sha Tin	23/8	12:08	23/8	12:50	-			
打鼓嶺	Ta Kwu Ling	23/8	08:56	23/8	10:35	-			
青衣島 蜆殼油庫	Tsing Yi Shell Oil Depot	23/8	10:37	23/8	13:34	-			

- 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。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 or gale force winds. Winds might fluctuate above or below the specified wind speeds in between the times indicated.

表 3.3.3 天鴿掠過期間，香港天文台總部及其他各站所錄得的日雨量  
Table 3.3.3 Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Hato

站 (參閱圖 3.3.3)		八月二十二日	八月二十三日	八月二十四日	總雨量(毫米)
Station (See Fig. 3.3.3)		22 Aug	23 Aug	24 Aug	Total rainfall (mm)
香港天文台 Hong Kong Observatory		2.0	67.1	微量 Trace	69.1
香港國際機場 Hong Kong International Airport (HKA)		20.4	58.7	2.4	81.5
長洲 Cheung Chau (CCH)		1.5	32.0	0.0	33.5
H23	香港仔 Aberdeen	1.5	51.5	0.0	53.0
N05	粉嶺 Fanling	3.0	49.0	1.0	53.0
N13	糧船灣 High Island	17.5	46.0	0.0	63.5
K04	佐敦谷 Jordan Valley	2.0	66.5	0.0	68.5
N06	葵涌 Kwai Chung	0.5	82.0	0.0	82.5
H12	半山區 Mid Levels	3.0	71.0	0.0	74.0
N09	沙田 Sha Tin	0.5	88.5	3.5	92.5
H19	筲箕灣 Shau Kei Wan	8.5	62.5	0.0	71.0
SEK	石崗 Shek Kong	1.0	96.0	0.0	97.0
K06	蘇屋邨 So Uk Estate	3.5	89.0	0.0	92.5
R31	大美督 Tai Mei Tuk	2.5	66.0	[2.5]	[71.0]
R21	踏石角 Tap Shek Kok	19.0	82.5	[3.0]	[104.5]
TMR	屯門水庫 Tuen Mun Reservoir	4.6	73.2	0.0	77.8
N17	東涌 Tung Chung	29.5	56.5	0.0	86.0

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

表 3.3.4 天鴿掠過期間，香港各潮汐站所錄得的最高潮位及最大風暴潮  
Table 3.3.4 Times and heights of the maximum sea level and the maximum storm surge recorded at tide stations in Hong Kong during the passage of Hato

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	3.57	23/8	10:27	1.18	23/8	10:27
石壁	Shek Pik	3.91	23/8	11:30	1.54	23/8	11:32
大廟灣*	Tai Miu Wan*	3.14	23/8	07:53	1.05	23/8	07:53
大埔滘	Tai Po Kau	4.09	23/8	10:58	1.65	23/8	10:58
尖鼻咀	Tsim Bei Tsui	4.56	23/8	13:42	2.42	23/8	13:42
橫瀾島*	Waglan Island*	2.97	23/8	07:35	0.76	23/8	07:35

\*數據不完整 \* incomplete data

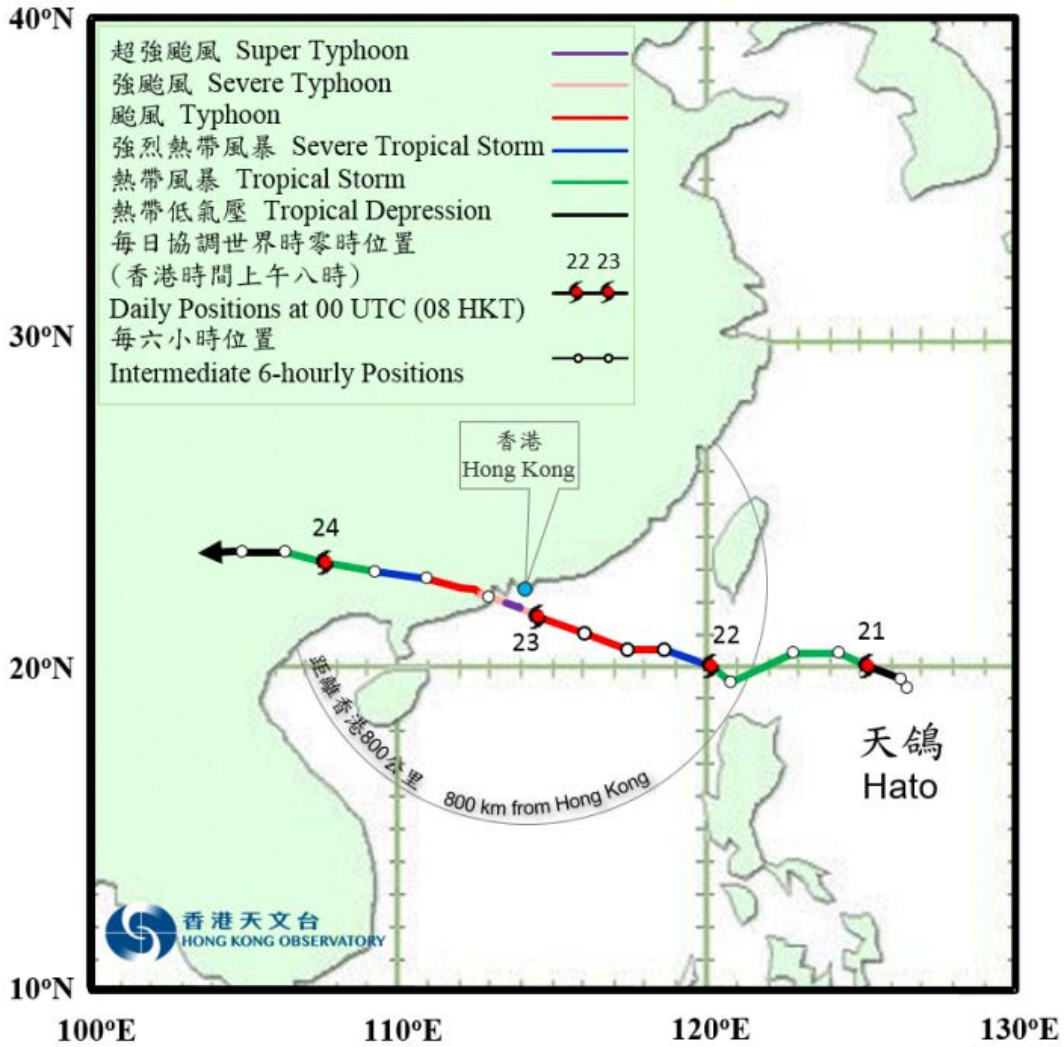


圖 3.3.1a 二零一七年八月二十日至二十四日天鴿的路徑圖。

Figure 3.3.1a Track of Hato on 20 – 24 August 2017.



圖 3.3.1b 天鴿接近香港時的路徑圖。

Figure 3.3.1b Track of Hato near Hong Kong.

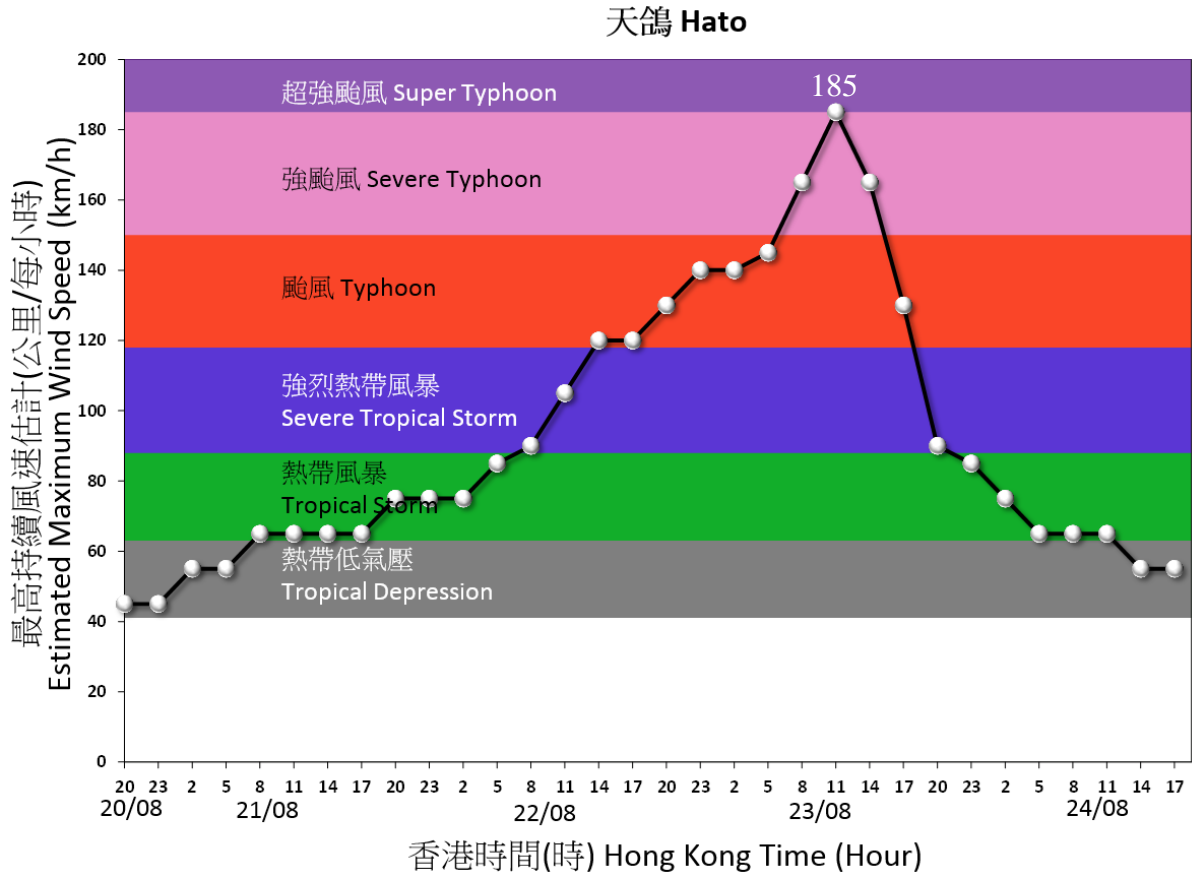


圖 3.3.2 天鴿中心附近最高持續風速的時間序列。

Figure 3.3.2 Time series of the maximum sustained wind speed near the centre of Hato.

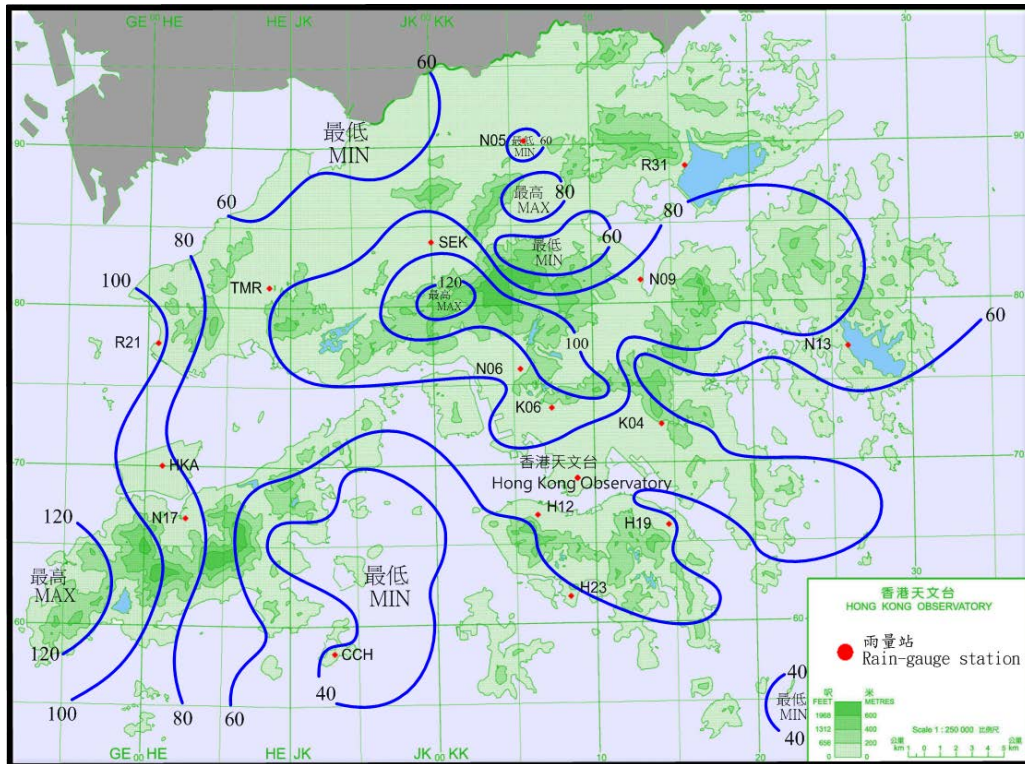


圖 3.3.3 二零一七年八月二十二日至二十四日的雨量分佈(等雨量線單位為毫米)。

Figure 3.3.3 Rainfall distribution on 22 - 24 August 2017 (isohyets in millimetres).

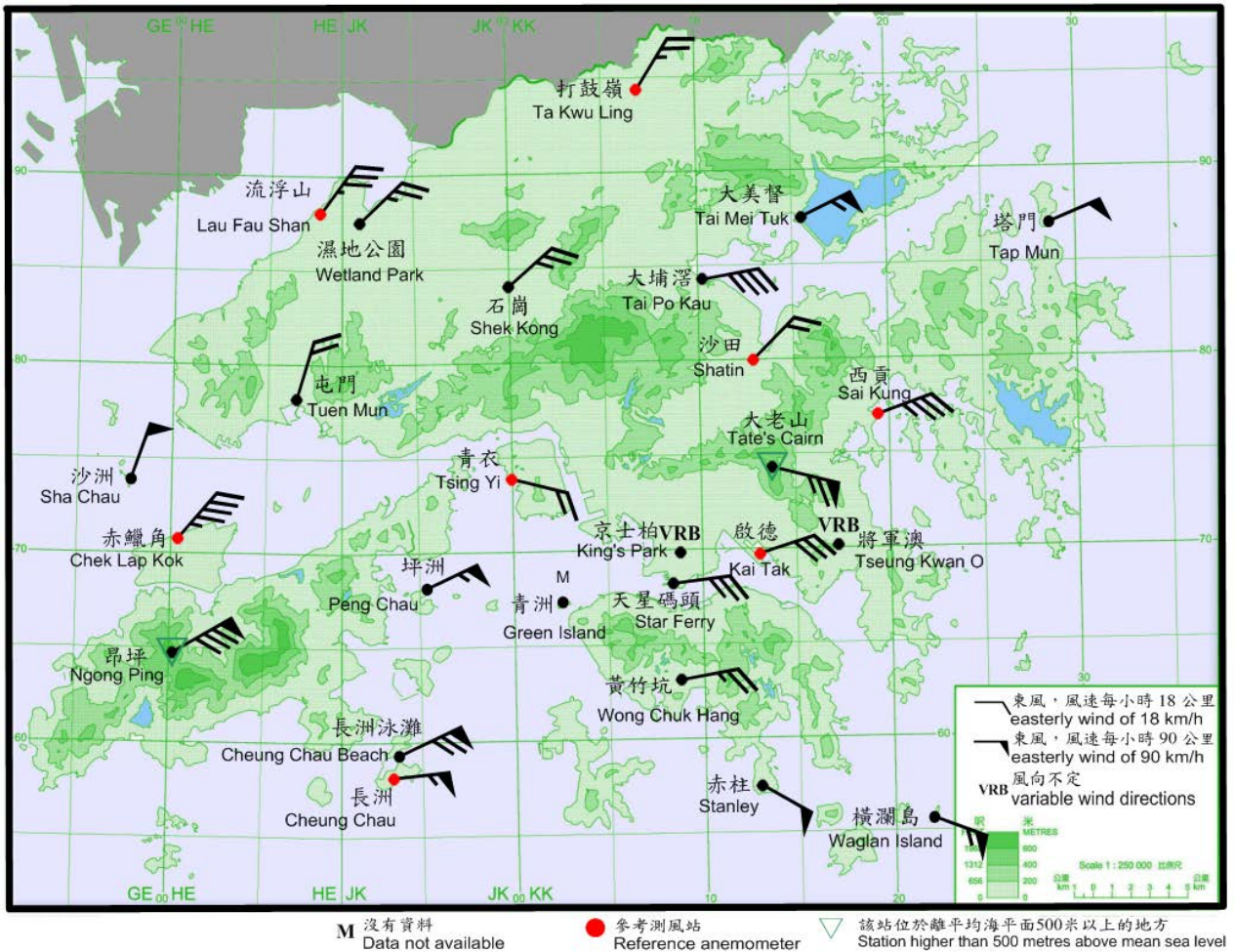


圖 3.3.4a 二零一七年八月二十三日上午 10 時正香港各站錄得的十分鐘平均風向和風速。當時本港普遍吹東至東北風，長洲泳灘、大老山及昂坪的風力達到颶風程度。

Figure 3.3.4a 10-minute mean wind direction and speed recorded at various stations in Hong Kong at 10 a.m. on 23 August 2017. Winds were generally from the east to northeast over the territory, with winds reaching hurricane force at Cheung Chau Beach, Tate's Cairn and Ngong Ping at that time.

註：京士柏及將軍澳當時錄得的十分鐘平均風速分別為每小時 36 及 20 公里。

Note: The 10-minute mean wind speeds recorded at the time at King's Park and Tseung Kwan O were 36 km/h and 20 km/h respectively.

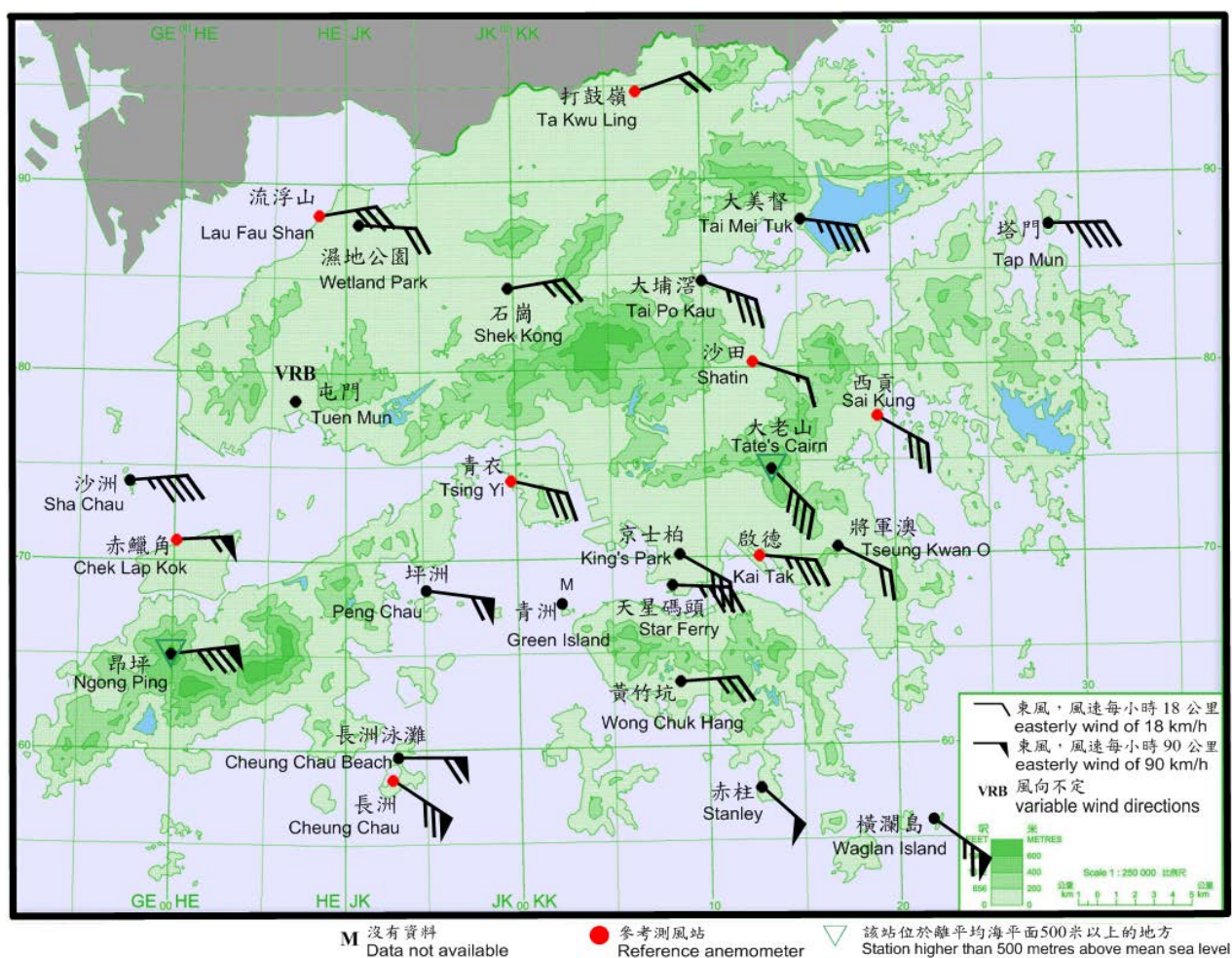


圖 3.3.4b 二零一七年八月二十三日上午 11 時正香港各站錄得的十分鐘平均風向和風速。當時本港普遍吹東至東南風，長洲及昂坪的風力達到颶風程度。

Figure 3.3.4b 10-minute mean wind direction and speed recorded at various stations in Hong Kong at 11 a.m. on 23 August 2017. Winds were generally from the east to southeast over the territory, with winds reaching hurricane force at Cheung Chau and Ngong Ping at that time.

註： 屯門當時錄得的十分鐘平均風速為每小時 30 公里。

Note: The 10-minute mean wind speeds recorded at the time at Tuen Mun was 30 km/h.

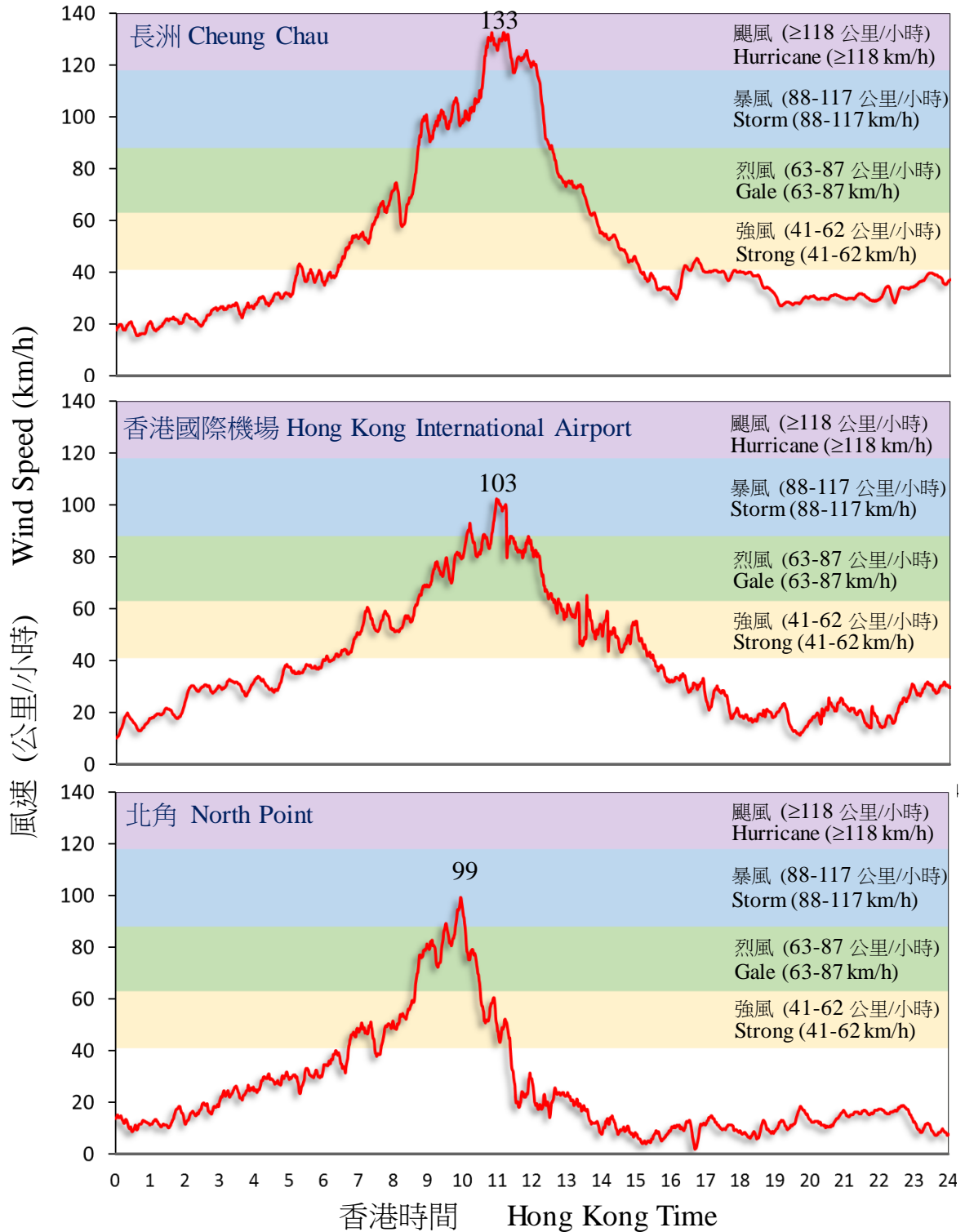


圖 3.3.5 二零一七年八月二十三日在長洲、香港國際機場及北角錄得的十分鐘風速。  
 Figure 3.3.5 Traces of 10-minute wind speed at Cheung Chau, Hong Kong International Airport and North Point on 23 August 2017.



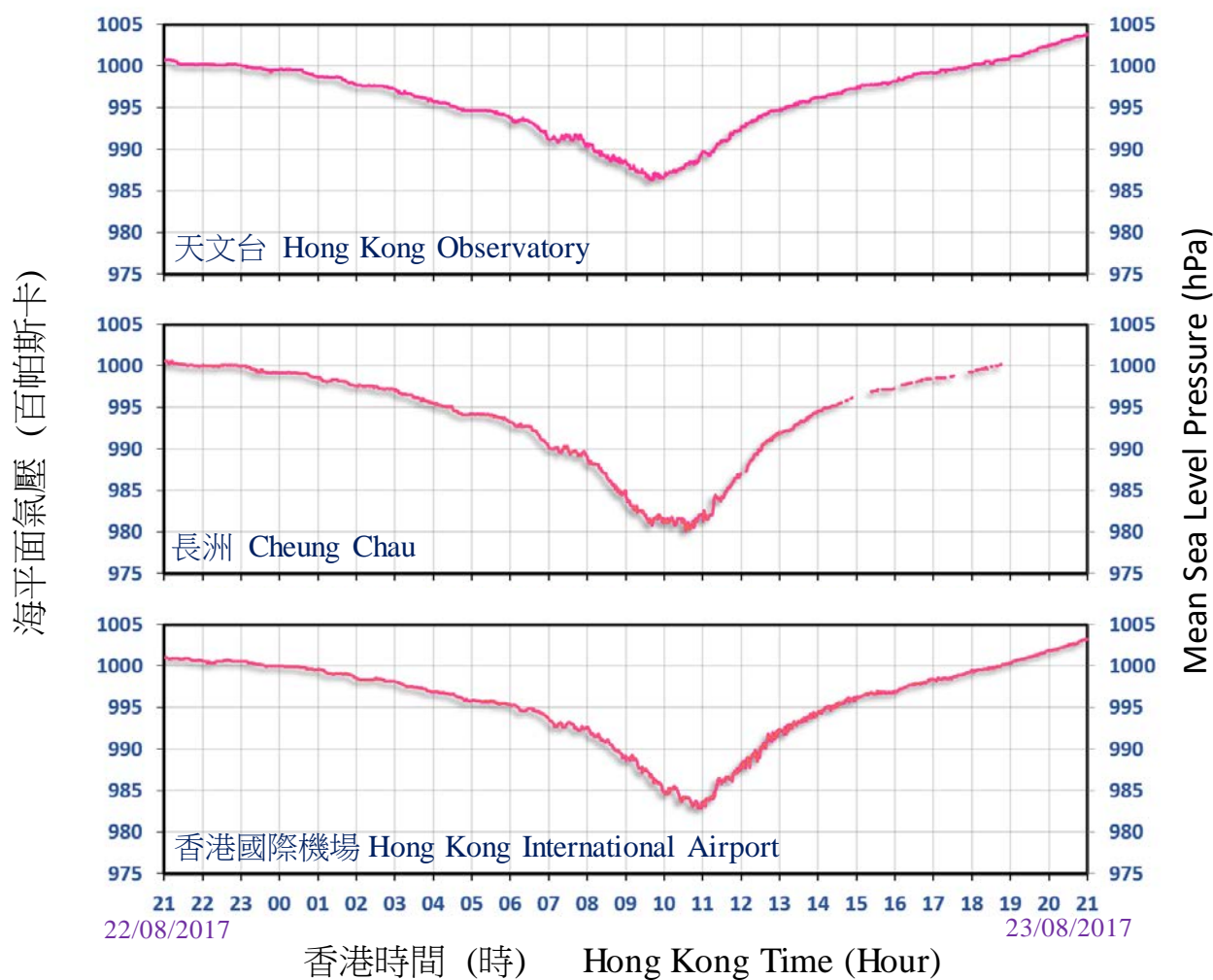


圖 3.3.6 二零一七年八月二十二至二十三日香港天文台、長洲及香港國際機場錄得的海平面氣壓。

Figure 3.3.6 Traces of mean sea-level pressure recorded at the Hong Kong Observatory, Cheung Chau and Hong Kong International Airport on 22 and 23 August 2017.

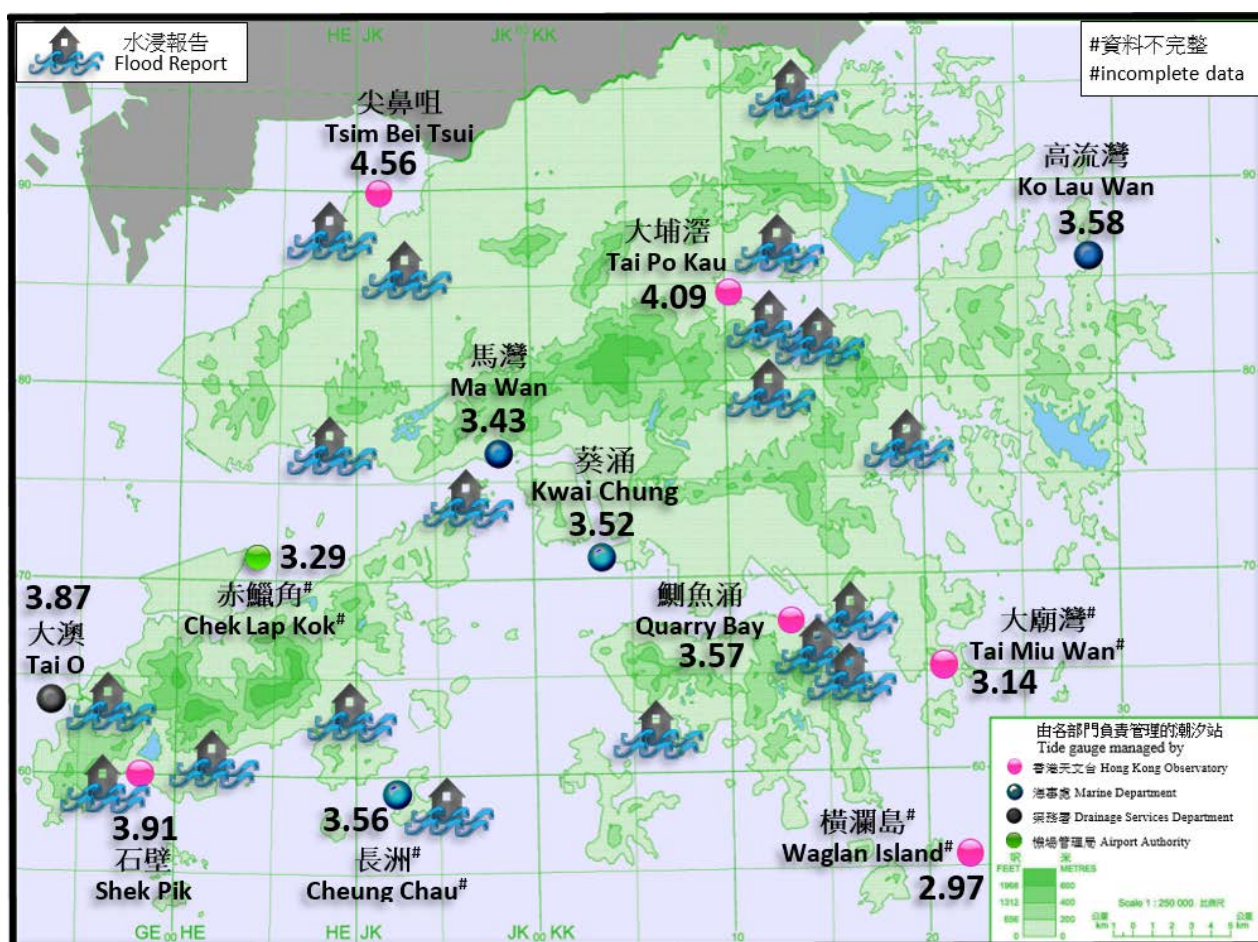


圖 3.3.7 二零一七年八月二十三日香港各潮汐站錄得的最高潮位(單位為米，海圖基準面以上)及根據政府部門、新聞及社交媒體的水浸報告。

Figure 3.3.7 Maximum sea level (metres above Chart Datum) recorded at various tide stations in Hong Kong and flood reports from government departments, news and social media on 23 August 2017.

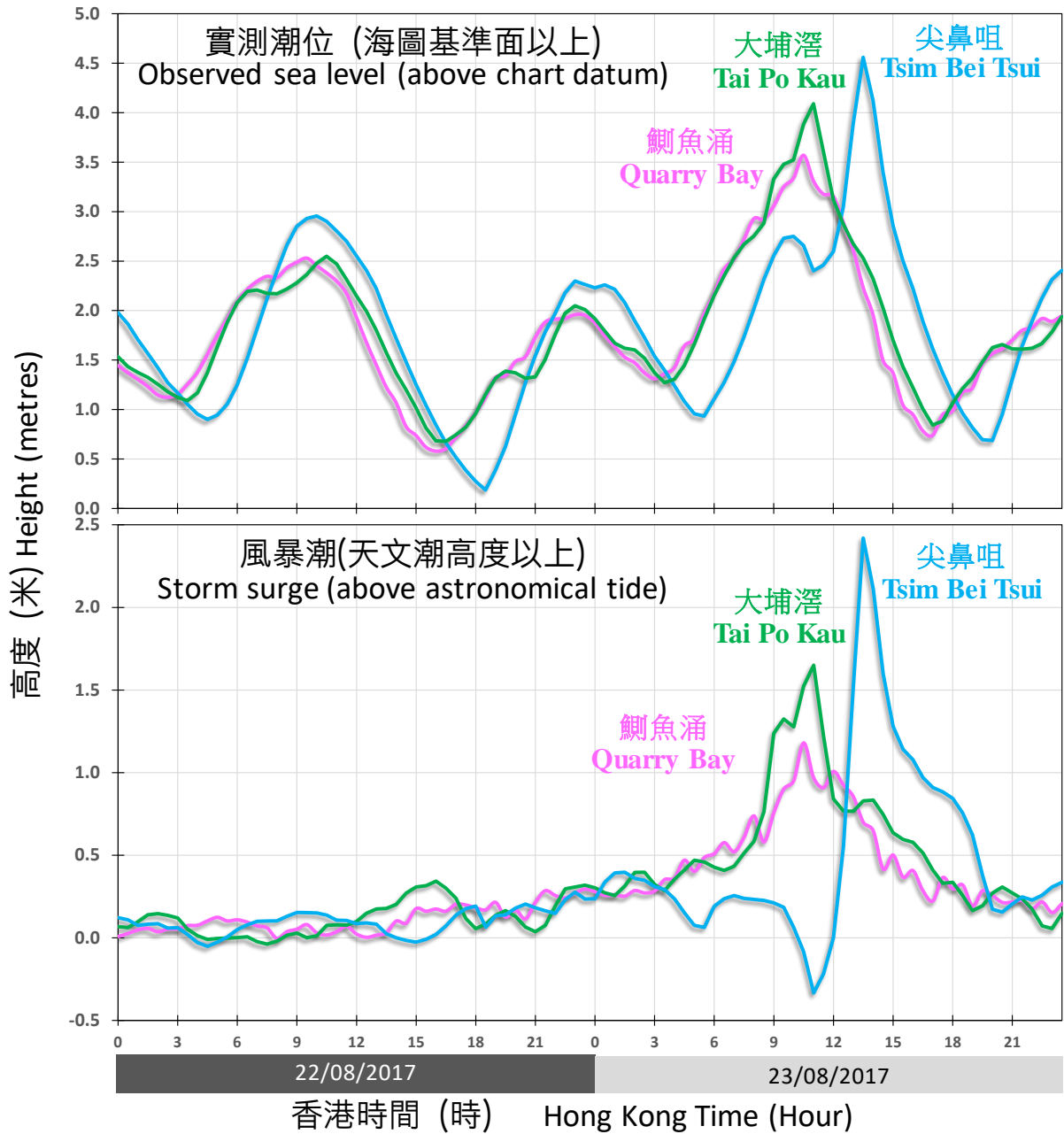


圖 3.3.8 二零一七年八月二十二至二十三在鯽魚涌、大埔滘及尖鼻咀錄得的潮位(海圖基準面以上)及風暴潮(天文潮高度以上)。

Figure 3.3.8 Traces of sea level (above chart datum) and storm surge (above astronomical tide) recorded at Quarry Bay, Tai Po Kau, and Tsim Bei Tsui on 22 and 23 August 2017.

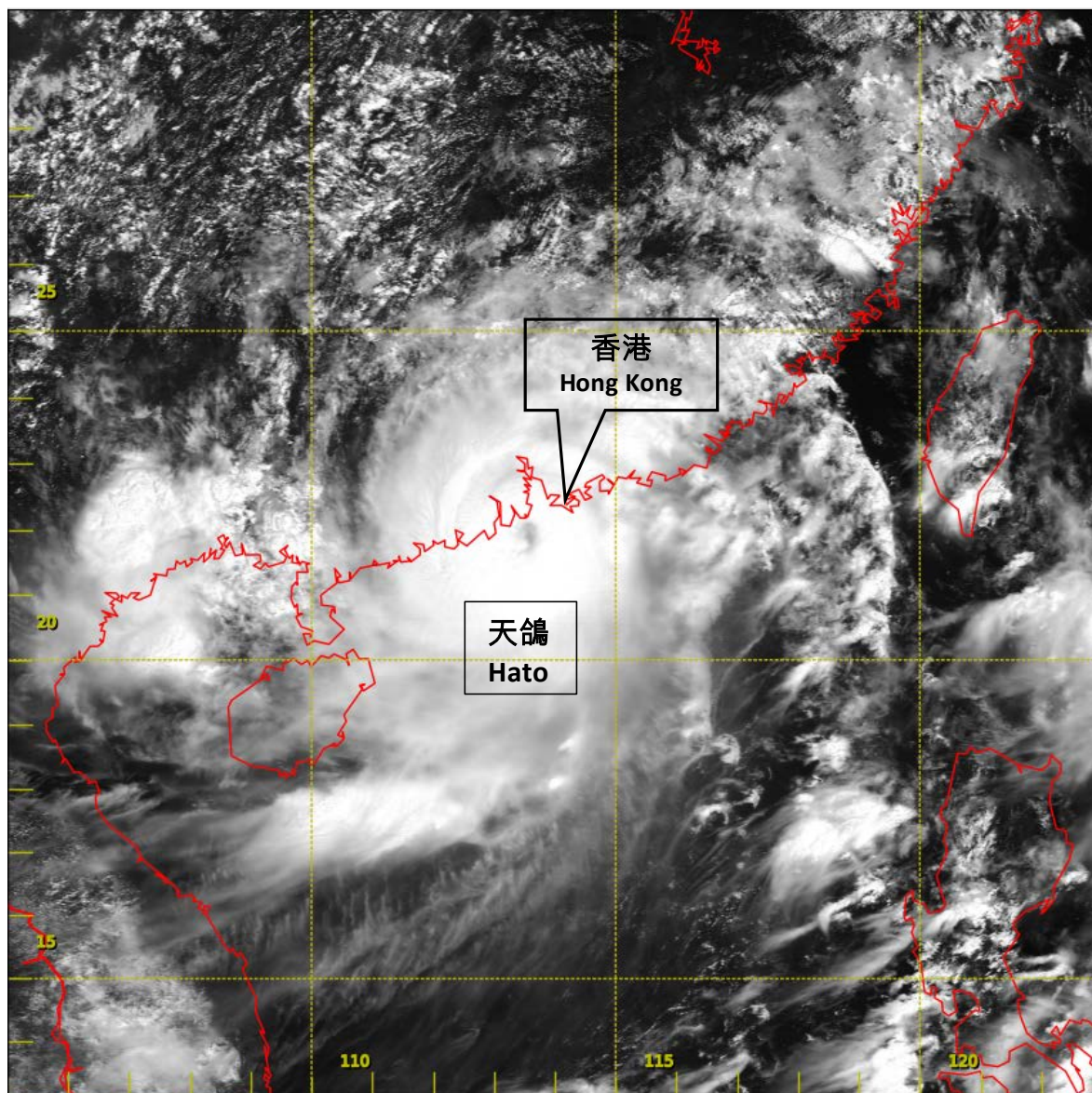


圖 3.3.9 二零一七年八月二十三日上午 11 時左右的可見光衛星圖片，當時天鴿達到其最高強度，中心附近最高持續風速估計為每小時 185 公里。

Figure 3.3.9 Visible satellite imagery around 11 a.m. on 23 August 2017, when Hato was at peak intensity with estimated maximum sustained winds of 185 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).]

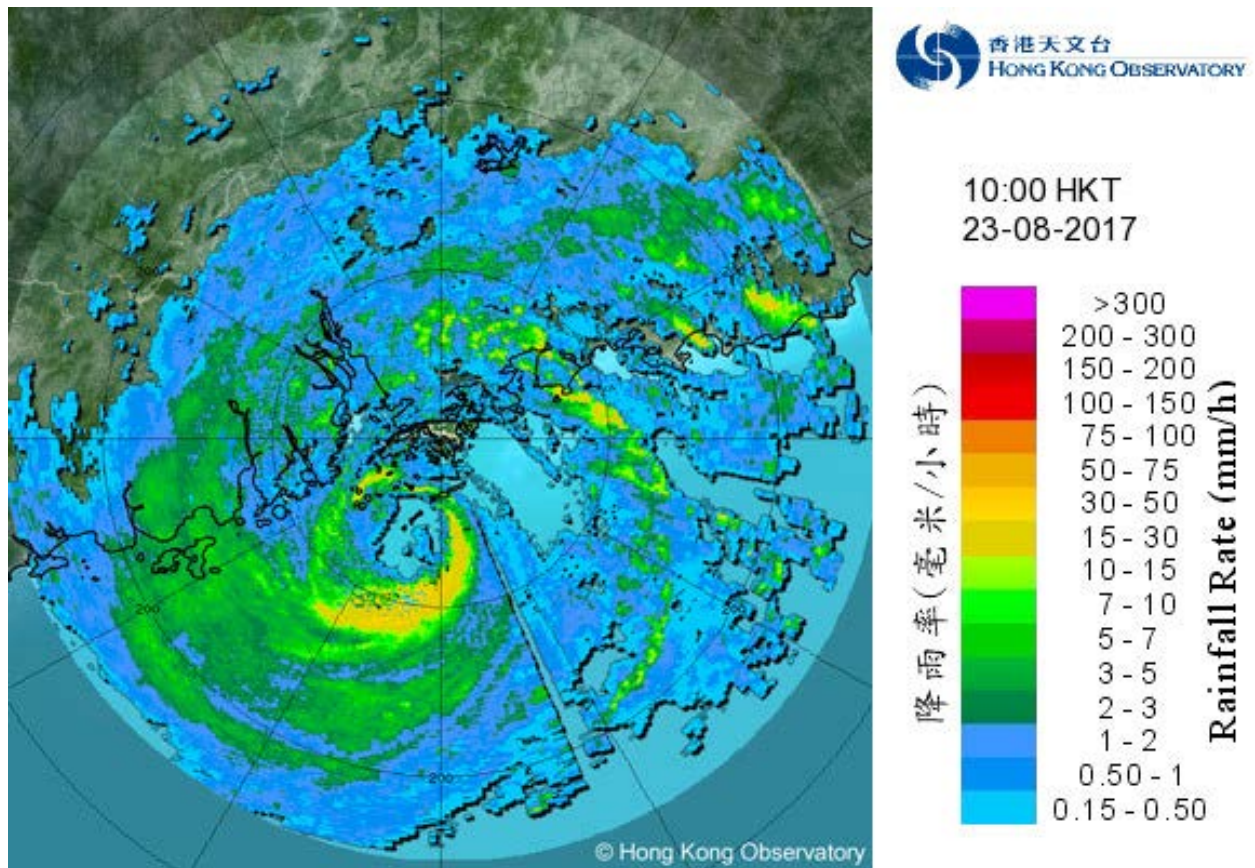


圖 3.3.10 二零一七年八月二十三日上午 10 時天鴿最接近天文台總部時的雷達回波圖像。

Figure 3.3.10 Image of radar echoes at 10:00 a.m. on 23 August 2017 when Hato was closest to the Hong Kong Observatory Headquarters.

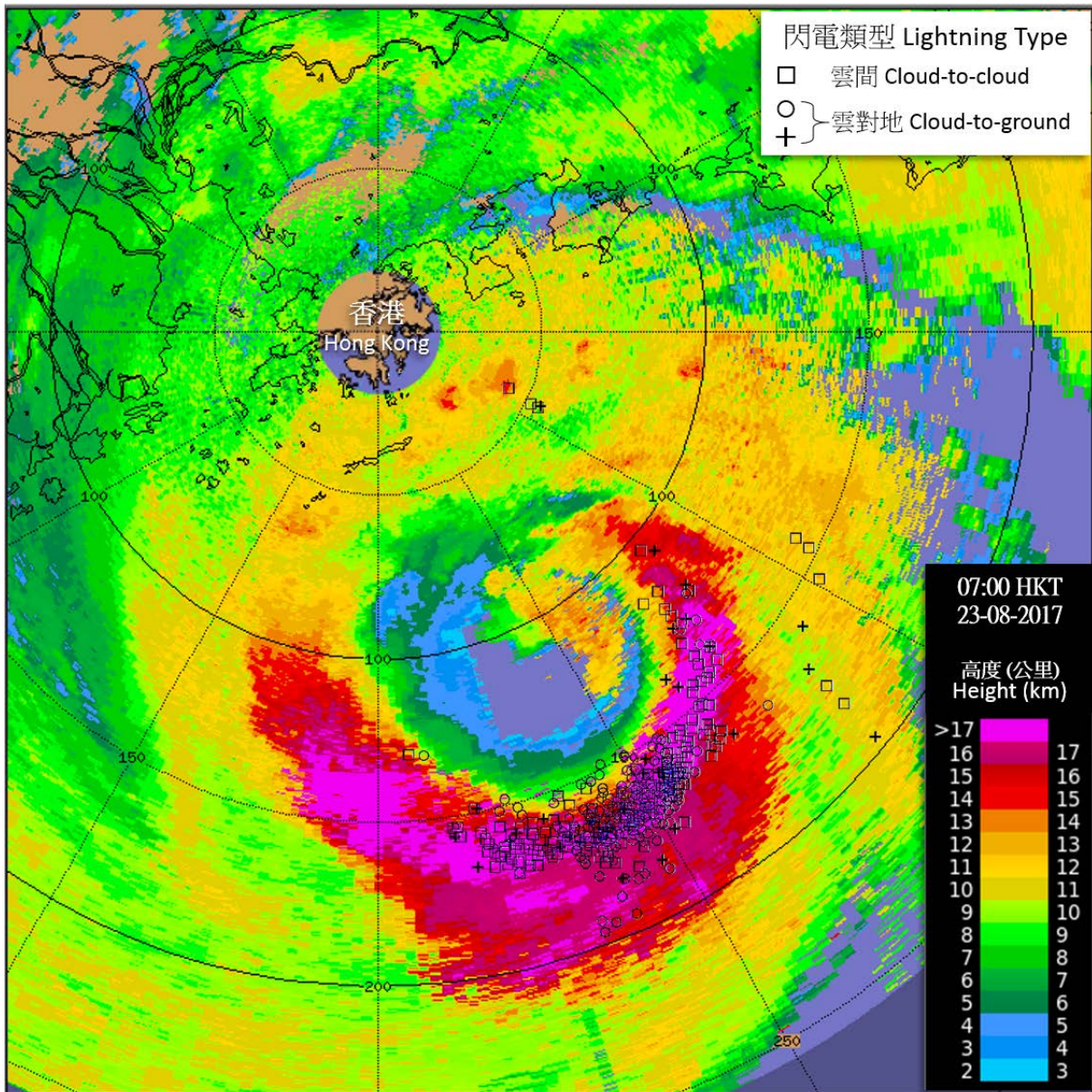


圖 3.3.11 二零一七年八月二十三日上午 7 時由雷達數據估算的雲頂高度疊加過去三十分鐘閃電位置的圖像。東南方眼壁附近出現非常強烈的對流和頻密閃電，雲頂高度超過 16 公里，直達對流層頂部。

Figure 3.3.11 Image of cloud top height estimated using radar data at 7 a.m. on 23 August 2017, overlaid with lightning locations during the past 30 minutes. Very intense convection and frequent lightning appeared near the eyewall of Hato over the southeastern quadrant with the cloud top reaching over 16 km to the top of the troposphere.



小西灣 Siu Sai Wan



美孚 Mei Foo

圖 3.3.12 天鴿襲港期間本港多處有樹木倒塌。(圖片鳴謝: Emile Ho、W.O. Wong 和 Y. K. Chow (社區天氣觀測計劃)、David Grund、江偉和李子祥)  
Figure 3.3.12 The passage of Hato resulted in fallen trees in many parts of the territory. (Photos courtesy of Emile Ho, W.O. Wong and Y. K. Chow from Community Weather Observation Scheme, David Grund, W. Kong, and T. C. Lee)



尖沙咀 Tsim Sha Tsui



長洲 Cheung Chau

圖 3.3.12 (續)

Figure 3.3.12 (Cont'd)





尖沙咀東 Tsim Sha Tsui East



屯門 Tuen Mun

圖 3.3.12 (續)

Figure 3.3.12 (Cont'd)



圖 3.3.13 天鴿襲港期間，紅磡碼頭巨浪拍岸。(圖片鳴謝: James Reynolds)

Figure 3.3.13 High waves affected Hung Hom Pier during the passage of Hato. (Photo courtesy of James Reynolds)



圖 3.3.14 灣仔及中環分別有商業大廈的玻璃幕牆被吹毀。(圖片鳴謝: 秦志豪先生和 Kevin Campbell)

Figure 3.3.14 Glass curtain walls of several commercial buildings in Wan Chai and Central were shattered. (Photos courtesy of W. Chun and Kevin Campbell)



圖 3.3.14 (續)

Figure 3.3.14 (Cont'd)



圖 3.3.15a 杏花邨一帶嚴重水浸，海水湧入邨內。(圖片鳴謝: Steve Lee 和岑富祥)  
Figure 3.3.15a Heng Fa Chuen was seriously flooded with sea water rushing into the estate.  
(Photos courtesy of Steve Lee and F. C. Sham)



圖 3.3.15a (續)

Figure 3.3.15a (Cont'd)

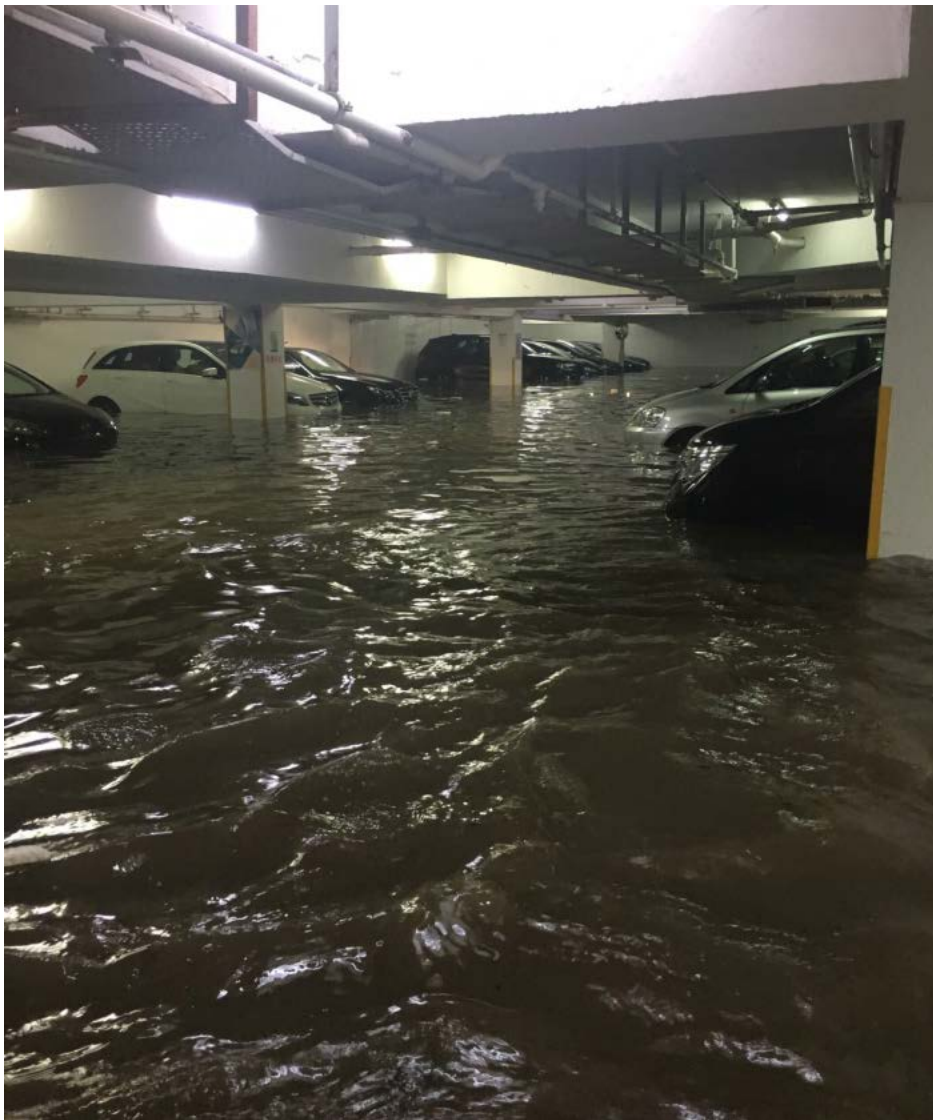


圖 3.3.15b 杏花邨有地下停車場完全被海水淹浸，多輛汽車被淹沒。(圖片鳴謝: Steve Lee 和岑富祥)

Figure 3.3.15b Sea water flowed into an underground car park in Heng Fa Chuen, submerging a number of private vehicles inside. (Photos courtesy of Steve Lee and F.C. Sham)



圖 3.3.15c 海水湧入小西灣運動場。(圖片鳴謝: Charmaine Mok)

Figure 3.3.15c Siu Sai Wan Sports Ground was flooded by sea water. (Photo courtesy of Charmaine Mok)





圖 3.3.16 大澳水浸嚴重，部份地區水深及胸。(圖片鳴謝: 渠務署和一市民)  
Figure 3.3.16 Serious flooding in Tai O with water level reaching the chest high in some places. (Photos courtesy of Drainage Services Department and a member of the public)



圖 3.3.16 (續)

Figure 3.3.16 (Cont'd)



圖 3.3.17 沙田城門河及吐露港沿岸一帶的單車徑及行人隧道被淹浸。(圖片鳴謝: Toni Fung 和 Daisy Ho (社區天氣觀測計劃), Howl Ho )

Figure 3.3.17 The cycle tracks and subways near Shing Mun River in Sha Tin and coastal area of Tolo Harbour were flooded. (Photos courtesy of Toni Fung and Daisy Ho from Community Weather Observation Scheme, Howl Ho)



圖 3.3.17 (續)

Figure 3.3.17 (Cont'd)



圖 3.3.18 元朗明渠及山貝河暴漲，附近一帶水浸。(圖片鳴謝: 文錦豪 (社區天氣觀測計劃) )

Figure 3.3.18 The surge of water level in Yuen Long Nullah and Shan Pui River resulted in flooding over the areas. (Photos courtesy of Man Kam-hoo from Community Weather Observation Scheme)



圖 3.3.19a 將軍澳海濱長廊行人路被海浪破壞。(圖片鳴謝: Bowie Wong (社區天氣觀測計劃))

Figure 3.3.19a Waterfront Promenade at Tseung Kwan O was damaged by sea waves. (Photo courtesy of Bowie Wong from Community Weather Observation Scheme)



圖 3.3.19b 長洲東灣一帶的圍欄被海浪破壞。(圖片鳴謝: Remington Yu (社區天氣觀測計劃))

Figure 3.3.19b The fences near Cheung Chau Tung Wan were damaged by sea waves. (Photo courtesy of Remington Yu from Community Weather Observation Scheme)



圖 3.3.20 多艘貨船在香港西南約 30 公里的水域擱淺，共 39 名船員獲救。(圖片鳴謝：政府飛行服務隊)

Figure 3.3.20 A number of vessels ran aground about 30 km southwest of Hong Kong and a total of 39 crew members were rescued. (Photos courtesy of Government Flying Service)



圖 3.3.20 (續)

Figure 3.3.20 (Cont'd)





圖 3.3.21 澳門有住宅大廈的窗戶玻璃爆裂。(圖片鳴謝: 方志剛)  
Figure 3.3.21 Window panes of residential buildings in Macao were broken. (Photo courtesy of Clarence Fong)



圖 3.3.22 位於澳門十月初五馬路的颱風委員會秘書處遭受風暴潮破壞。(圖片鳴謝：颱風委員會秘書處)

Figure 3.3.22 Typhoon Committee Secretariat at Avenida de 5 de Outubro, Macao was damaged by storm surge. (Photos courtesy of Typhoon Committee Secretariat)



圖 3.3.23 澳門各區受風暴潮影響，出現嚴重水浸。(圖片鳴謝: Tomas Choi, Denise Lau)

Figure 3.3.23 Serious flooding in Macao under the influence of storm surge. (Photos courtesy of Tomas Choi and Denise Lau)



圖 3.3.23 (續)

Figure 3.3.23 (Cont'd)