

### 3.5 超強颱風山竹 (1822)：二零一八年九月七日至十七日

山竹是二零一八年第五個影響香港的熱帶氣旋。繼二零一七年天鴿後，天文台在山竹襲港期間再次發出十號颶風信號，並持續了 10 小時，是戰後第二最長的十號颶風信號，僅次於一九九九年約克的 11 小時。山竹環流廣闊、風力強勁、移動迅速，加上其特別的風力結構，為香港帶來破壞性風力和破紀錄的風暴潮，並造成廣泛及嚴重的影響。

熱帶低氣壓山竹於九月七日在關島以東約 2 330 公里的北太平洋西部上形成，隨後數天迅速向西移動，並逐漸增強，於九月十一日發展為超強颱風。山竹在九月十四日轉向西北移動，在登陸呂宋前達到其最高強度，中心附近的最高持續風速估計為每小時 250 公里。山竹橫過呂宋北部後減弱，並繼續迅速以西北路徑橫過南海北部，移近廣東沿岸。山竹在九月十六日上午減弱為強颱風，黃昏前在廣東台山附近登陸，隨後移入廣東西部及進一步減弱。翌日晚上山竹在廣西減弱為一個低壓區。

根據報章報導，山竹為呂宋帶來狂風暴雨。最少有 82 人死亡、138 人受傷及兩人失蹤，約 15 000 間房屋倒塌。山竹為珠江口沿岸帶來破壞性的風力及嚴重的風暴潮，多處建築物及沿岸設施受損，低窪地區嚴重水浸。澳門有 40 人受傷，超過 5 500 人撤離，有多宗建築物損毀報告。內港離地面水浸高度曾達 1.9 米以上。山竹亦在廣東、廣西、海南、貴州及雲南造成至少六人死亡，接近 330 萬人受災。

由於山竹移動迅速及預料會對香港構成嚴重威脅，天文台早於九月十四日晚上 10 時 20 分發出一號戒備信號，當時山竹集結在香港之東南偏東約 1 110 公里，是有記錄以來最遠的一次。九月十五日日間本港吹輕微至和緩的東北風。隨著山竹迅速移近廣東沿岸，天文台在九月十五日下午 4 時 20 分發出三號強風信號，當時山竹位於香港之東南約 650 公里。晚上本港風勢增強，吹清勁至強風程度的偏北風。隨著山竹繼續逼近珠江口一帶，天文台在九月十六日上午 1 時 10 分發出八號東北烈風或暴風信號，當時山竹集結在香港之東南約 410 公里。其後本港風勢繼續增強，離岸及高地吹烈風至暴風程度的偏北風。由於預料當山竹接近香港時，本港風力會進一步增強，天文台在上午 7 時 40 分發出九號烈風或暴風風力增強信號，當時山竹已移至香港之東南偏南約 200 公里。其後本港風力急速增強，天文台在上午 9 時 40 分發出十號颶風信號，當時山竹位於香港之東南偏南

約 160 公里。在八號、九號及十號熱帶氣旋警告信號發出的時候，風暴與本港的距離均是自一九六一年以來該信號的最遠紀錄。九月十六日日間本港各區長時間受具破壞性的暴風至颶風所吹襲。山竹在下午 1 時左右最接近香港，當時它位於天文台總部之西南偏南約 100 公里。而隨著山竹在香港的西南面掠過，本港風向由東北逐漸轉為東南。黃昏前山竹在廣東台山附近登陸，遠離本港並逐漸減弱，當香港不再受颶風威脅，天文台在下午 7 時 40 分改發八號東南烈風或暴風信號。晚間本港風力繼續減弱，天文台在九月十七日上午 5 時 20 分改發三號強風信號，並於當日下午 2 時 40 分改發一號戒備信號。隨著山竹進一步移入內陸和減弱，天文台在九月十七日晚上 7 時 10 分取消所有熱帶氣旋警告信號。

山竹橫過呂宋北部後減弱，其眼壁的對流亦較橫過呂宋前弱，相反離山竹中心約 100 至 200 公里之間的螺旋雨帶仍然保持強烈對流和十分完整的結構。綜合微波衛星圖像(圖 3.5.6)、多普勒天氣雷達圖像(圖 3.5.7)、地面觀測和氣象偵察飛行數據的分析，山竹眼壁外螺旋雨帶的風力明顯高於眼壁附近的環流。當山竹在香港南面經過時，該強烈螺旋雨帶在日間影響本港。再加上山竹在南海北部移動速度相當快(時速達 35 公里)，而香港長時間位於風暴的右半圓(亦即危險半圓)，風暴的風力及移動速度的疊加令香港當日大部分時間受到猛烈風力吹襲。因此，雖然山竹的路徑較接近澳門、珠海及台山一帶，但由於山竹特別的風力結構，本港所受風力卻是珠江三角洲一帶之中最強勁的。

山竹吹襲香港期間，香港各測風站錄得的最高風力載於表 3.5.1，香港整體的風力超越過去三十年引致天文台需要發出十號颶風信號的熱帶氣旋所帶來的風力，包括一九九九年的約克、二零一二年的韋森特及二零一七年的天鴿(見表 3.5.2)。九月十六日在橫瀾島及長洲錄得的最高 60 分鐘平均風速分別為每小時 161 及 157 公里，均是該站歷來的第二最高，僅次於一九八三年的愛倫。當日香港大部分地區錄得每小時超過 150 公里的陣風，大老山的陣風更達每小時 256 公里，排名於一九六二年的溫黛和一九六四年的露比之後。而位於維多利亞港內的北角測風站錄得的最高 10 分鐘平均風速為每小時 124 公里(圖 3.5.9)，是一九九八年該站啓用以來首次錄得持續颶風。另外，正在清水灣測試的自動測風站更錄得高達每小時 191 公里的 10 分鐘平均風速(註 1)，相信是天文台自一九八零年代開始在香港安裝自動氣象站以來的近地面最高紀錄。

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	977.0	16/9	下午 1 時 28 分
香港國際機場	973.9	16/9	下午 2 時 11 分
京士柏	977.5	16/9	下午 1 時 44 分
打鼓嶺	981.3	16/9	下午 12 時 52 分
大埔	980.5	16/9	下午 1 時 17 分
沙田	980.1	16/9	下午 12 時 21 分
上水	979.8	16/9	下午 2 時 06 分
流浮山	976.7	16/9	下午 1 時 59 分
長洲	971.8	16/9	下午 2 時 10 分
橫瀾島	973.5	16/9	下午 12 時 10 分

山竹襲港的路徑是引致香港出現嚴重風暴潮的典型路徑。當時山竹在香港西南偏南近距離掠過，與其相關的猛烈東至東南風把海水推向並堆積在岸邊。加上山竹環流廣闊，它的風場推動較廣闊的洋面，繼而進一步推高水位。山竹所帶來的風暴潮令本港水位普遍升高超過兩米，引致本港多處出現異常高的水位。天文台的六個潮汐站當中的五個(鰂魚涌、大埔滘、尖鼻咀、大廟灣及石壁)錄得破紀錄的風暴潮，其中鰂魚涌和大埔滘潮汐站分別錄得 2.35 米及 3.40 米的風暴潮增水。而橫瀾島潮汐站因在山竹吹襲期間受嚴重損毀，並未能錄得最高潮位紀錄。當日鰂魚涌的潮位(即天文潮位加風暴潮)最高升至 3.88 米(海圖基準面以上，下同)，超越了天鴿襲港時錄得的 3.57 米，並僅次於 1962 年溫黛襲港期間錄得的 3.96 米。大埔滘則錄得最高潮位 4.71 米，同樣僅次於溫黛襲港期間錄得的 5.03 米。有關山竹掠過期間香港各潮汐站所錄得的最高潮位可參考圖 3.5.11。

山竹前沿的下沉氣流於九月十四日及十五日為本港帶來大致天晴及酷熱的天氣。九月十五日天文台氣溫飆升至 35.1 度，是有記錄以來九月的第二高。在山竹環流的影響下，九月十六日本港天氣急速轉壞及有狂風大雨。當日本港大部分地區錄得超過 150 毫米的雨量。天文台曾發出紅色暴雨警告及新界北部水浸特別報告。受到與山竹相關的雨帶影響，九月十七日本港仍間中有狂風驟雨。

山竹吹襲期間，本港至少有 458 人受傷，另有超過六萬宗的塌樹報告，數目是有記錄以來最多，多處有物件被吹倒、高空墜物及建築物受損，大角咀有建築

地盤一個天秤被吹斷，亦有大廈外牆及天台屋被強風吹倒。秀茂坪有垃圾收集站的鐵皮屋頂被吹走。全港有至少 500 宗玻璃窗或玻璃幕牆損毀報告，當中紅磡、灣仔、中環、旺角有商業大廈玻璃幕牆爆裂。將軍澳有住宅單位的玻璃窗被吹毀，荔景亦有住宅單位的冷氣機被吹入室內，導致一人受傷。全港有超過四萬戶電力供應中斷(圖 3.5.13)，包括多個新界西及新界北的鄉郊地區、西貢、將軍澳及杏花邨的個別樓宇、長洲、吉澳、東平洲等。當中約 13 500 戶停電超過 24 小時，而一些較偏遠地區及個別樓宇的電力供應在四日後仍未能完全恢復。停電亦引致一些地方的食水供應受到影響。

與二零一七年的天鴿相比，山竹所引致的暴雨、風暴潮及巨浪造成的破壞更為嚴重。大澳、石壁、梅窩、長洲、杏花邨、小西灣、海怡半島、鯉魚門、將軍澳、沙田、大埔、西貢、元朗、流浮山、沙頭角、石澳及坪洲等多處沿岸地區因風暴潮和大浪而嚴重水浸。多個沿岸設施包括污水處理廠、公眾泳灘、海濱長廊及運動場都受到不同程度的損毀。大澳、鯉魚門及沙田曾大屋村一帶因嚴重水浸，多名村民需要疏散。海水亦湧入杏花邨及將軍澳南一帶，有地下停車場被海水淹浸，多輛汽車被淹沒。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亦被海水淹浸。西貢南圍、流浮山、大埔三門仔新村、沙頭角新村亦有多間村屋水浸。在巨浪下數以百計不同大小的船隻擱淺、沉沒或受嚴重破壞。各區的農田、魚排及魚塘均有不同程度的損毀。

本港海陸空交通在山竹來襲當天癱瘓，而翌日部分地區的主要道路仍因塌樹或水浸需封閉，公共交通服務未能完全恢復正常，大部分專營巴士路線停駛，港鐵東鐵綫和輕鐵只維持有限度服務。多個渡輪碼頭設施嚴重損毀，影響渡輪復航。香港國際機場有 889 班航班取消。

有關山竹與其他曾引致本港發出十號颶風信號的熱帶氣旋比較，可參考天文台網誌《令我們覺醒的「山竹」》：<https://www.hko.gov.hk/tc/blog/00000216.htm>。

表 3.5.1 是山竹影響香港期間各站錄得的最高風速。表 3.5.2 比較山竹與過去三十年引致天文台需要發出十號颶風信號的熱帶氣旋的最高風速及最高陣風。表 3.5.3 - 3.5.5 分別是山竹影響香港期間各站錄得的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 3.5.1 - 3.5.2 分別為山竹的路徑圖和山竹中心附近最高持續風速。圖 3.5.3 是本港的雨量分佈圖。圖 3.5.4- 3.5.5 分別為山竹的衛星及雷達圖像（註 2）。圖 3.5.6 是山竹風力結構變化的示意圖。圖 3.5.7 為山竹的多普勒雷達回波圖像。圖 3.5.8 是香港各站錄得的風向和風速。圖

3.5.9 顯示長洲、橫瀾島及北角錄得的風速。圖 3.5.10 顯示天文台總部、長洲及橫瀾島錄得的海平面氣壓。圖 3.5.11 顯示各潮汐站錄得的最高潮位及水浸報告。圖 3.5.12 顯示鰂魚涌、大埔滘及尖鼻咀錄得的潮位及風暴潮。圖 3.5.13 顯示在山竹的影響下，有關電力及食水中斷的報告。一些山竹在香港造成的破壞的圖片可參見圖 3.5.14-3.5.19，更多有關山竹為香港帶來破壞的相片及短片，請參看山竹風暴破壞互動地圖網頁([https://www.weather.gov.hk/tc/cwsrc/index\\_mangkhut.html](https://www.weather.gov.hk/tc/cwsrc/index_mangkhut.html))。

註 1：清水灣自動站位處複雜地形，風速計高度在海平面以上七十多米，估計相應近海平面的風速低於每小時 185 公里。

註 2：請參看天文台網頁有關山竹的衛星及雷達圖像動畫(<https://www.weather.gov.hk/tc/informtc/mangkhut18/mangkhut.htm>)。

### 3.5 Super Typhoon Mangkhut (1822):7 – 17 September 2018

Mangkhut was the fifth tropical cyclone affecting Hong Kong in 2018. After Hato in 2017, the Hurricane Signal No. 10 was issued again during the passage of Mangkhut and lasted for ten hours. It was the second longest duration of Signal No. 10 since World War II, just after the 11 hours of York in 1999. Mangkhut is characterized by its extensive circulation, ferocious winds and fast movement as well as special wind structure. It brought damaging winds and record-breaking storm surges to Hong Kong, causing widespread and serious impacts.

Tropical depression Mangkhut formed over the western North Pacific about 2 330 km east of Guam on 7 September. Moving westwards quickly, it intensified gradually in the following few days. Mangkhut developed into a super typhoon on 11 September. It turned to the northwest on 14 September, reaching its peak intensity before making landfall over Luzon with an estimated maximum sustained wind of 250 km/h near the centre. Mangkhut weakened after crossing the northern part of Luzon and continued to track northwestwards quickly across the northern part of the South China Sea towards the coast of Guangdong. Mangkhut weakened into a severe typhoon on the morning of 16 September and made landfall in the vicinity of Taishan of Guangdong before dusk. It then moved into western part of Guangdong and weakened further. Mangkhut degenerated into an area of low pressure over Guangxi the next night.

According to press reports, Mangkhut brought torrential rain and squalls to Luzon. There were at least 82 deaths, 138 injuries and two missing. Around 15 000 houses collapsed. Mangkhut brought damaging winds and severe storm surge to the coast of Pearl River estuary, leading to damages of many buildings and coastal structures, as well as serious inundation of low lying areas. In Macao, 40 people were injured and more than 5 500 people were evacuated. There were a number of reports of building damages. The height of the inundation in Inner Harbour once reached 1.9 metres or higher above ground. At least six people were killed and more than 3.3 million were affected in Guangdong, Guangxi, Hainan, Guizhou and Yunnan.

As Mangkhut was a fast-moving storm and posed a serious threat to Hong Kong, the Hong Kong Observatory issued the Standby Signal No. 1 well in advance at 10:20 p.m. on 14 September when Mangkhut was about 1 110 km east-southeast of the territory, the farthest distance on record. Local winds were light to moderate northeasterlies during the day of 15 September. As Mangkhut edged closer to the coast of Guangdong quickly, the No. 3 Strong Wind Signal was issued at 4:20 p.m. on 15 September when Mangkhut was about 650 km southeast of Hong Kong. Local winds strengthened at night, becoming fresh to strong northerlies. With Mangkhut maintaining its course towards the Pearl River Estuary, the Observatory issued the No. 8 Northeast Gale or Storm Signal at 1:10 a.m. on 16 September when Mangkhut was about 410 km southeast of the territory. Local winds continued to strengthen afterwards, with gale to storm force northerlies offshore and on high ground. As winds were expected to increase further when Mangkhut came closer to Hong Kong, the Increasing Gale or Storm Signal No. 9 was issued at 7:40 a.m. when Mangkhut was about 200 km south-southeast of the territory. With local winds picking up rapidly afterwards, the Observatory issued the Hurricane Signal No. 10 at 9:40 a.m. when Mangkhut was about 160 km south-southeast of the territory. At the time when tropical cyclone signals number

8, 9 and 10 were issued, the storm was the farthest away from Hong Kong for the corresponding signal since 1961. The destructive storm to hurricane force winds affected Hong Kong for a long period of time during the day of 16 September. Mangkhut came closest to the Hong Kong Observatory Headquarters around 1 p.m. when its centre was located at about 100 km to the south-southwest. With Mangkhut shirting past to the southwest of Hong Kong, local winds veered from the northeast to the southeast gradually. Mangkhut made landfall over the vicinity of Taishan of Guangdong before dusk. With Mangkhut moving away from Hong Kong and weakening gradually, hurricane force winds no longer affected the territory. The No. 8 Southeast Gale or Storm Signal was issued at 7:40 p.m. to replace the No. 10 Signal. With local winds subsiding continuously, the No. 3 Strong Wind Signal was issued at 5:20 a.m. on 17 September, followed by the No. 1 Standby Signal at 2:40 p.m. Mangkhut moved further inland and weakened, and all tropical cyclone warning signals were cancelled at 7:10 p.m. that night.

While Mangkhut weakened after moving across the northern part of Luzon with weaker convection over the eyewall, the spiral rainband between 100 and 200 kilometres from its centre remained intense and the structure was intact. Analysis of microwave satellite images (Figure 3.5.6), Doppler weather radar images (Figure 3.5.7), surface observations and flight reconnaissance data revealed that the winds associated with the spiral rainband outside the eyewall were stronger than those near the eyewall. When Mangkhut skirted past to the south of Hong Kong, the intense spiral rainband swept across Hong Kong during the day. Moreover, Mangkhut moved rapidly over the northern part of the South China Sea (speed reaching 35 km/h). With Hong Kong staying in the right semicircle of the storm (also known as the dangerous semicircle) for a long time, the superposition of wind speed and moving speed of the storm brought ferocious winds to Hong Kong most of the time during the day. In view of the special wind structure of Mangkhut, the wind strength experienced by Hong Kong was the strongest among the Pearl River Delta areas even though Mangkhut tracked closer to Macao, Zhuhai and Taishan.

Table 3.5.1 showed the maximum wind recorded at various stations in Hong Kong during the passage of Mangkhut. Under the influence of Mangkhut, the wind strength over Hong Kong was generally stronger than that of the tropical cyclones necessitating the issuance of No. 10 signals in the recent three decades, including York in 1999, Vicente in 2012 and Hato in 2017 (Table 3.5.2). The maximum 60-minute mean wind speeds recorded at Waglan Island and Cheung Chau were 161 km/h and 157 km/h respectively. Both are the second highest records at the corresponding stations, just lower than the record high of Ellen in 1983. Gusts over 150 km/h were registered in most parts of the territory on that day and a maximum gust of 256 km/h was recorded at Tate's Cairn, ranking after Wanda in 1962 and Ruby in 1964. A maximum 10-minute mean wind of 124 km/h was registered at North Point anemometer located inside the Victoria Harbour (Figure 3.5.9), the first time sustained hurricane force winds were recorded at the station since the start of its operation in 1998. Besides, the automatic weather station under testing at Clear Water Bay even recorded a maximum 10-minute average wind speed of 191 km/h (Note 1), which is believed to be the highest record near the surface since the Observatory's commencement of automatic weather station installation in Hong Kong in the 1980s.

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	977.0	16/9	1:28 p.m.
Hong Kong International Airport	973.9	16/9	2:11 p.m.
King's Park	977.5	16/9	1:44 p.m.
Ta Kwu Ling	981.3	16/9	12:52 p.m.
Tai Po	980.5	16/9	1:17 p.m.
Shatin	980.1	16/9	12:21 p.m.
Sheung Shui	979.8	16/9	2:06 p.m.
Lau Fau Shan	976.7	16/9	1:59 p.m.
Cheung Chau	971.8	16/9	2:10 p.m.
Waglan Island	973.5	16/9	12:10 p.m.

Mangkhut's track is a typical one causing severe storm surge in Hong Kong. When it skirted past to the south-southwest of Hong Kong, the associated ferocious east to southeasterly winds pushed water towards the shore and piled up against the coast. In addition, Mangkhut's extensive circulation drove a more extensive area of the ocean which in turn raised the water level further. The severe storm surge induced by Mangkhut raised the water level in Hong Kong generally by more than two metres, resulting in an unusually high water level in many places in Hong Kong. Five of the six tide stations of the Observatory (including Quarry Bay, Tai Po Kau, Tsim Bei Tsui, Tai Miu Wan and Shek Pik) registered record breaking storm surges. Among them, the water level increases recorded at the tide station at Quarry Bay and Tai Po Kau were 2.35 metres and 3.40 metres respectively. As the tide station at Waglan Island was severely damaged by Mangkhut, the highest sea level was not recorded. The sea level (the sum of astronomical tide and storm surge) of Quarry Bay rose to a maximum of 3.88 metres (above Chart Datum, same below), exceeding the 3.57 metres registered during the passage of Hato in 2017, and only lower than the record high of 3.96 metres set by Wanda in 1962. A maximum water level of 4.71 metres was recorded at Tai Po Kau, also only lower than the record high of 5.03 metres set by Wanda. For the maximum sea level recorded at various tide stations in Hong Kong on 16 September 2018, please refer to Figure 3.5.11.

The subsiding air ahead of Mangkhut's circulation brought mainly fine and very hot weather to Hong Kong on 14 and 15 September. Temperature at the Hong Kong Observatory soared to 35.1 degrees on 15 September, the second highest record for September. Under the influence of the circulation of Mangkhut, the weather in Hong Kong deteriorated rapidly with heavy rain and squalls on 16 September. More than 150 millimetres of rainfall were recorded over most parts of the territory on that day. Red Rainstorm Warning and Special Announcement on Flooding in the Northern New Territories were issued by the Observatory. Under the influence of the rain bands associated with Mangkhut, there were still occasional squally showers on 17 September.

In Hong Kong, at least 458 people were injured during the passage of Mangkhut. There



were more than 60 000 reports of fallen trees, the highest number on record. Many incidents of blowing down and falling objects as well as building damages were reported. A tower crane of a construction site in Tai Kok Tsui was blown down. The wall of a building and a rooftop home also collapsed. The roof of a refuse collection centre in Sau Ming Ping was also blown away. At least 500 reports of smashed windows or glass curtain walls were received. Among them, glass curtain walls of several commercial buildings in Hung Hom, Wan Chai, Central and Mong Kok were damaged. Windows were broken in several apartment buildings in Tseung Kwan O. An air conditioning unit was crashed into an apartment in Lai King, injuring a person inside. Electricity supply to over 40 000 households in Hong Kong was interrupted (Figure 3.5.13), including Sai Kung, Cheung Chau, Kat O, Tung Ping Chau, individual buildings in Tseung Kwan O and Heng Fa Chuen, and rural areas in the western and northern New Territories. Power outage to some 13 500 households lasted for more than 24 hours, and the electricity supply to some remote areas and individual buildings were not fully restored even after four days. Supply of fresh water in some places was also affected due to power outages.

The destructions caused by the heavy rain, storm surge and high waves induced by Mangkhut are more serious than those of Hato in 2017. Severe inundation triggered by storm surge and huge waves were observed in a number of coastal areas, including Tai O, Shek Pik, Mui Wo, Cheung Chau, Heng Fa Chuen, Siu Sai Wan, South Horizons, Lei Yue Mun, Tseung Kwan O, Sha Tin, Tai Po, Sai Kung, Yuen Long, Lau Fau Shan, Sha Tau Kok, Shek O and Peng Chau. Many coastal structures suffered from different levels of damages, including sewage treatment works, public beaches, waterfront promenades and sports ground. Flooding was serious in Tai O, Lei Yue Mun and Tsang Tai Uk in Shatin and many residents were evacuated. Sea water flowed into the estates and underground car parks in Hung Fa Chuen and Tseung Kwan O south, submerging a number of private vehicles inside. The cycle tracks and subways near Shing Mun River in Shatin, coastal area of Tolo Harbour, Lam Tsuen River in Tai Po were inundated. A number of villages houses in Nam Wai in Sai Kung, Lau Fau Shan, Sam Mun Tsai San Tsuen in Tai Po and San Tsuen in Sha Tau Kok were seriously flooded. Hundreds of vessels of various sizes were stranded, sunk or seriously damaged by the powerful waves. Farmland, fish rafts and fish ponds in all districts suffered different levels of damage.

Sea, land and air transportation services were paralyzed on the day Mangkhut battered Hong Kong. Owing to fallen trees and flooding, parts of the major roads were still closed and public transports could not be fully resumed the next day. Most of the public bus services were suspended and there were limited services of East Rail Line and Light Rail of MTR. Ferry services resumption was affected due to the damage of facilities at a number of ferry terminals. 889 flights were cancelled at the Hong Kong International Airport.

For comparison between Mangkhut and the tropical cyclones necessitating the issuance of the Hurricane Signal No. 10, please refer to the Observatory's Blog – "A Wake up Call from Mangkhut" (<https://www.hko.gov.hk/en/blog/00000216.htm>).

Information on the maximum wind during the passage of Mangkhut is given in Table 3.5.1. Table 3.5.2 is a comparison of the maximum wind during the passage of Mangkhut and the tropical cyclones necessitating the issuance of No. 10 signals in the recent three decades. Information of periods of strong and gale force winds, daily rainfall and maximum sea level reached in Hong Kong during the passage of Mangkhut is given in Tables 3.5.3 - 3.5.5 respectively. Figures 3.5.1 -

3.5.2 show respectively the track of Mangkhut and the maximum sustained wind speed near the centre of Mangkhut. Figure 3.5.3 is the rainfall distribution for Hong Kong. Figures 3.5.4 - 3.5.5 show respectively a satellite imagery and a radar imagery of Mangkhut (Note 2). Figure 3.5.6 is an illustration of the change of wind structure of Mangkhut. Figure 3.5.7 is the Doppler velocity of Mangkhut. Figure 3.5.8 shows the winds recorded at various stations in Hong Kong. Figure 3.5.9 shows traces of the wind speed recorded at Cheung Chau, Waglan Island and North Point. Figure 3.5.10 shows trace of mean sea-level pressure recorded at the Hong Kong Observatory's Headquarters, Cheung Chau and Waglan Island. Figure 3.5.11 shows the maximum sea level recorded at various tide stations in Hong Kong and flood reports. Figure 3.5.12 is the traces of sea level and storm surge recorded at Quarry Bay, Tai Po Kau and Tsim Bei Tsui. Figure 3.5.13 shows reports of interruption of power and water supply under the influence of Mangkhut. Figures 3.5.14-3.5.19 are some photos of the damages brought by Mangkhut in Hong Kong. Please refer to the Interactive Map of Storm Damage by Mangkhut for more photos and videos of damages brought by Mangkhut ([https://www.weather.gov.hk/en/cwsrc/index\\_mangkhut.html](https://www.weather.gov.hk/en/cwsrc/index_mangkhut.html)).

Note 1: The automatic weather station at Clear Water Bay is located on a complex terrain with the anemometer at an elevation over 70 metres above sea level. The corresponding wind speed near sea level is estimated to be lower than 185 km/h.

Note 2: The animation sequences of satellite and radar imageries are available on the Observatory's website at <https://www.weather.gov.hk/en/informtc/mangkhut18/mangkhut.htm>.

表 3.5.1 本港各站在山竹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 Mangkhut 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)	-	-	157	16/9	14:00	-	-	101	16/9	15:00
中環碼頭	Central Pier	東	E	169	16/9	12:30	東	E	99	16/9	13:00
長洲	Cheung Chau	東	E	212	16/9	14:10	東	E	151	16/9	15:00
長洲泳灘	Cheung Chau Beach	東北	NE	209	16/9	12:01	東北偏東	ENE	142	16/9	14:00
青洲	Green Island	東北偏北	NNE	229	16/9	10:29	東北	NE	124	16/9	11:00
香港國際機場	Hong Kong International Airport	東南偏東	ESE	157	16/9	16:26	東	E	99	16/9	15:00
啟德	Kai Tak	東北偏東	ENE	142	16/9	10:28	東南偏東	ESE	77	16/9	17:00
		東北偏東	ENE	142	16/9	13:59					
京士柏	King's Park	東北偏北	NNE	161	16/9	10:17	東	E	67	16/9	15:00
流浮山	Lau Fau Shan	東北偏東	ENE	166	16/9	12:40	東北偏東	ENE	96	16/9	14:00
北角	North Point	東	E	171	16/9	12:51	東	E	110	16/9	13:00
平洲	Ping Chau	東	E	124	16/9	11:30	東南偏南	SSE	47	16/9	11:00
西貢	Sai Kung	東北	NE	180	16/9	11:43	東北	NE	108	16/9	12:00
沙洲	Sha Chau	東	E	164	16/9	14:02	東南偏東	ESE	103	16/9	15:00
沙螺灣	Sha Lo Wan	東	E	169	16/9	14:11	東	E	87	16/9	15:00
沙田	Sha Tin	東北偏北	NNE	149	16/9	11:42	東北偏北	NNE	47	16/9	11:00
石崗	Shek Kong	東北	NE	164	16/9	11:22	東	E	72	16/9	15:00
九龍天星碼頭	Star Ferry (Kowloon)	東	E	135	16/9	13:48	東	E	79	16/9	14:00
打鼓嶺	Ta Kwu Ling	東北偏東	ENE	133	16/9	13:28	東北偏北	NNE	52	16/9	11:00
大美督	Tai Mei Tuk	東北偏東	ENE	198	16/9	12:08	東北偏東	ENE	139	16/9	13:00
大帽山	Tai Mo Shan	東南偏東	ESE	250	16/9	14:05	東南偏東	ESE	167	16/9	15:00
大埔滘	Tai Po Kau	東	E	146	16/9	13:09	東	E	88	16/9	13:00
大老山	Tate's Cairn	東北偏東	ENE	256	16/9	10:33	東北偏東	ENE	158	16/9	12:00
將軍澳	Tseung Kwan O	東北偏北	NNE	153	16/9	10:40	東北偏北	NNE	52	16/9	11:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	東南偏東	ESE	137	16/9	14:22	東南偏東	ESE	58	16/9	15:00
屯門政府合署	Tuen Mun Government Offices	東	E	133	16/9	14:01	東南	SE	51	16/9	17:00
橫瀾島	Waglan Island	東北	NE	220	16/9	10:14	東北	NE	158	16/9	11:00
濕地公園	Wetland Park	東	E	130	16/9	13:06	東	E	58	16/9	14:00
黃竹坑	Wong Chuk Hang	東北偏東	ENE	173	16/9	13:40	東北偏東	ENE	54	16/9	14:00

-沒有資料 data not available

昂坪、坪洲、塔門東- 沒有資料 Ngong Ping, Peng Chau and Tap Mun East- data not available

表 3.5.2 山竹與過去三十年引致天文台需要發出十號颶風信號的熱帶氣旋(約克、韋森特及天鴿)襲港期間錄得的最高 60 分鐘平均風速及最高陣風

Table 3.5.2 Maximum 60-minute mean wind speeds and maximum gusts recorded during the passage of Mangkhut and the tropical cyclones necessitating the issuance of No. 10 signals in the recent three decades (York, Vicente and Hato)

站 (參閱圖 1.1) Station (See Fig. 1.1)	最高 60 分鐘平均風速/最高陣風 (公里/小時) Maximum 60-minute mean wind speeds / Maximum gust peak speeds (km/h)			
	1999	2012	2017	2018
	約克 York	韋森特 Vicente	天鴿 Hato	山竹 Mangkhut
長洲 Cheung Chau	113/182	128/184	128/171	157/212
香港國際機場 Hong Kong International Airport	88/135	85/133	92/144	101/157
流浮山 Lau Fau Shan	106/158	59/106	70/112	96/166
啟德 Kai Tak	59/142	70/135	67/130	81/142
北角 North Point	77/155	67/130	85/137	110/171
西貢 Sai Kung	108/211	76/121	70/112	112/180
沙田 Sha Tin	51/153	41/88	40/104	51/149
九龍天星碼頭 Star Ferry (Kowloon)	81/149	83/122	63/112	85/135
青衣島蜆殼油庫 Tsing Yi Shell Oil Depot	85/153	43/106	45/106	59/137
打鼓嶺 Ta Kwu Ling	58/121	41/94	43/99	52/133
大尾督 Tai Mei Tuk	115/180	101/146	101/140	139/198
橫瀾島 Waglan Island	153/234	108/149	137/193	161/220

表 3.5.3 在山竹影響下，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 3.5.3 Periods during which sustained strong and gale force winds were attained at the eight reference anemometers when tropical cyclone warning signals for Mangkhut 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	15/9	21:27	17/9	18:13	16/9	04:20	17/9	08:04
香港國際機場	Hong Kong International Airport	16/9	03:47	17/9	09:23	16/9	07:53	17/9	01:35
啟德	Kai Tak	16/9	09:27	17/9	06:05	16/9	12:14	16/9	20:46
流浮山	Lau Fau Shan	16/9	01:11	17/9	01:06	16/9	08:13	16/9	16:34
西貢	Sai Kung	16/9	00:15	17/9	06:11	16/9	08:20	16/9	21:40
青衣島 蜆殼油庫	Tsing Yi Shell Oil Depot	16/9	07:20	16/9	22:46	16/9	14:40	16/9	14:41
沙田	Sha Tin	16/9	10:01	16/9	20:53	-			
打鼓嶺	Ta Kwu Ling	16/9	10:04	16/9	16:40	-			

- 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 3.5.4 山竹掠過期間，香港天文台總部及其他各站所錄得的日雨量  
Table 3.5.4 Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Mangkhut

站 (參閱圖 3.5.3) Station (See Fig. 3.5.3)		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	總雨量(毫米) Total rainfall (mm)
香港天文台 Hong Kong Observatory		0.0	微量 Trace	167.5	12.0	179.5
香港國際機場 Hong Kong International Airport (HKA)		0.0	微量 Trace	191.5	4.2	195.7
長洲 Cheung Chau (CCH)		[0.0]	0.0	79.0	9.0	[88.0]
H23	香港仔 Aberdeen	0.0	0.0	99.0	7.5	106.5
N05	粉嶺 Fanling	0.0	0.0	126.5	28.5	155.0
N13	糧船灣 High Island	0.0	0.0	[83.5]	2.0	[85.5]
K04	佐敦谷 Jordan Valley	0.0	0.0	160.0	6.0	166.0
N06	葵涌 Kwai Chung	0.0	0.0	214.0	22.5	236.5
H12	半山區 Mid Levels	0.0	0.0	143.0	22.0	165.0
N09	沙田 Sha Tin	1.5	0.0	223.0	0.0	224.5
H19	筲箕灣 Shau Kei Wan	0.0	0.0	138.5	6.5	145.0
SEK	石崗 Shek Kong	[0.0]	0.0	279.0	41.5	320.5
K06	蘇屋邨 So Uk Estate	0.0	0.0	[253.0]	17.0	[270.0]
R31	大美督 Tai Mei Tuk	0.5	0.0	[150.5]	[3.5]	[154.5]
R21	踏石角 Tap Shek Kok	0.0	0.0	213.0	36.0	249.0

東涌(N17)、屯門水庫(TMR) - 沒有資料 Tung Chung (N17), Tuen Mun Reservoir (TMR) - data not available

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

表 3.5.5 山竹掠過期間，香港各潮汐站所錄得的最高潮位及最大風暴潮  
Table 3.5.5 Times and heights of the maximum sea level and the maximum storm surge recorded at tide stations in Hong Kong during the passage of Mangkhut

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	3.88	16/9	14:42	2.35	16/9	14:42
石壁	Shek Pik	3.89	16/9	14:16	2.34	16/9	14:16
大廟灣*	Tai Miu Wan*	4.19	16/9	13:41	2.77	16/9	13:41
大埔滘	Tai Po Kau	4.71	16/9	12:34	3.40	16/9	12:34
尖鼻咀	Tsim Bei Tsui	4.18	16/9	17:14	2.58	16/9	17:21

\*基於不完整的數據 \* based on incomplete data

橫瀾島潮汐站在山竹吹襲期間受嚴重損毀，損毀前錄得的最高潮位為 2.68 米。

The tide station at Waglan Island was severely damaged by Mangkhut and the maximum sea level of 2.68 m was recorded before damage.

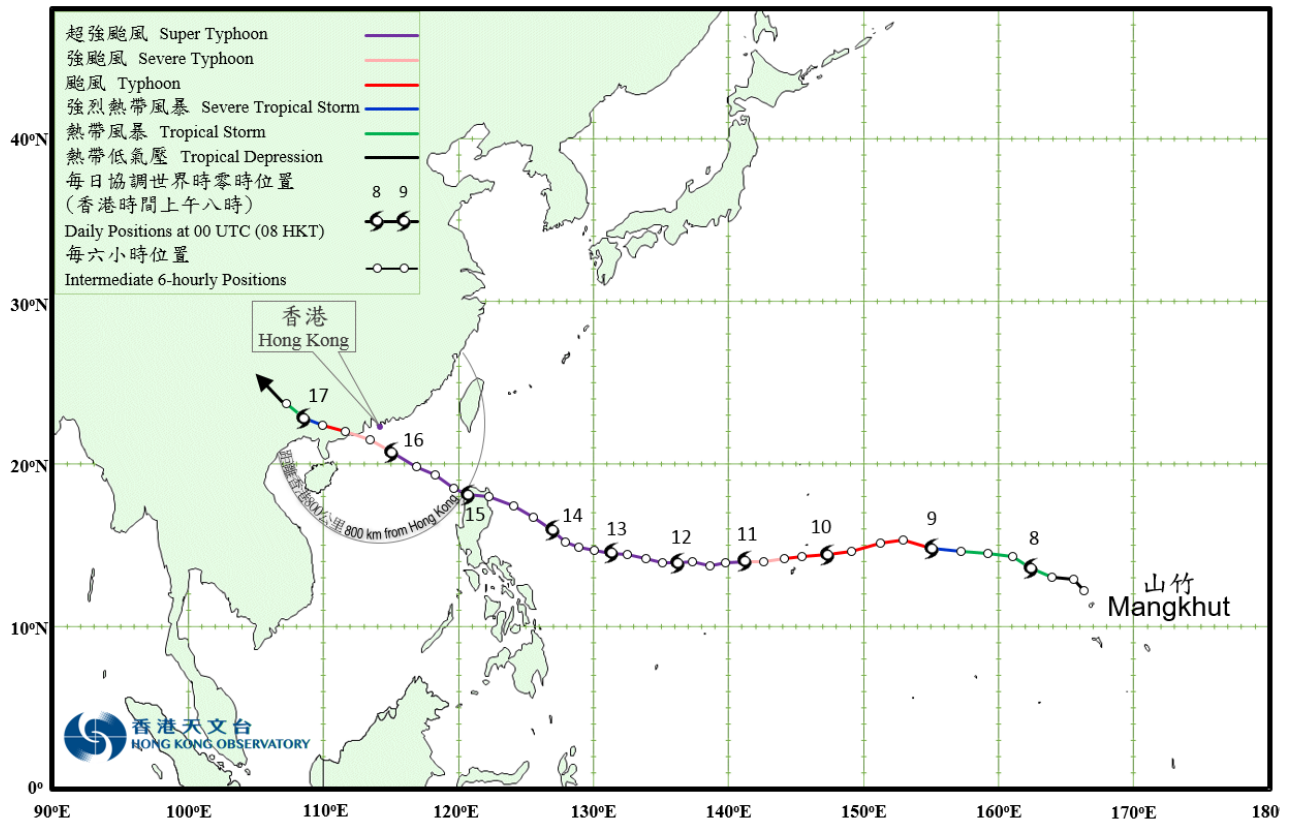


圖 3.5.1a 二零一八年九月七日至十七日山竹的路徑圖。

Figure 3.5.1a Track of Mangkhut on 7 – 17 September 2018.



圖 3.5.1b 山竹接近香港時的路徑圖。  
Figure 3.5.1b Track of Mangkhut near Hong Kong.



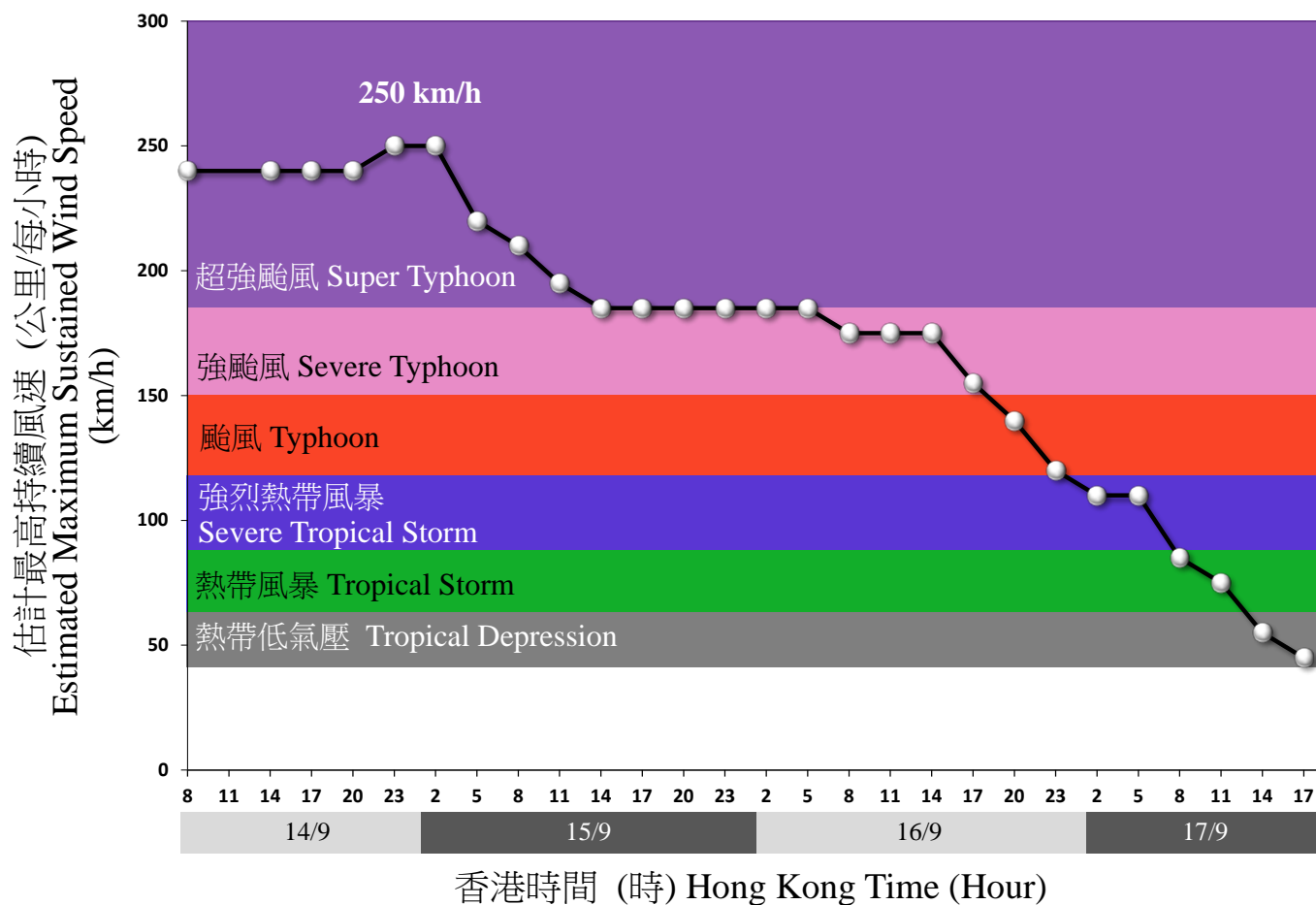


圖 3.5.2a 二零一八年九月十四日至十七日山竹最高持續風速的時間序列。  
 Figure 3.5.2a Time series of the maximum sustained wind speed near the centre of Mangkhut: 14 to 17 September 2018.

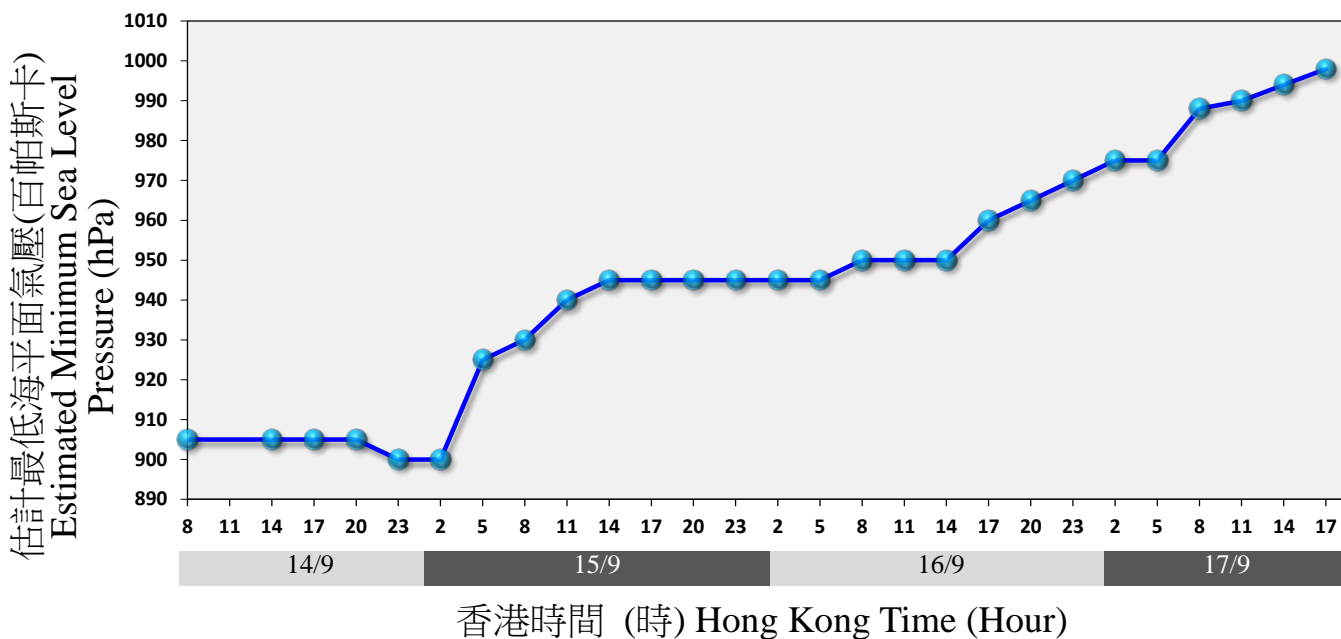


圖 3.5.2b 二零一八年九月十四日至十七日山竹最低海平面氣壓的時間序列。  
 Figure 3.5.2b Time series of minimum sea level pressure of Mangkhut: 14 to 17 September 2018.

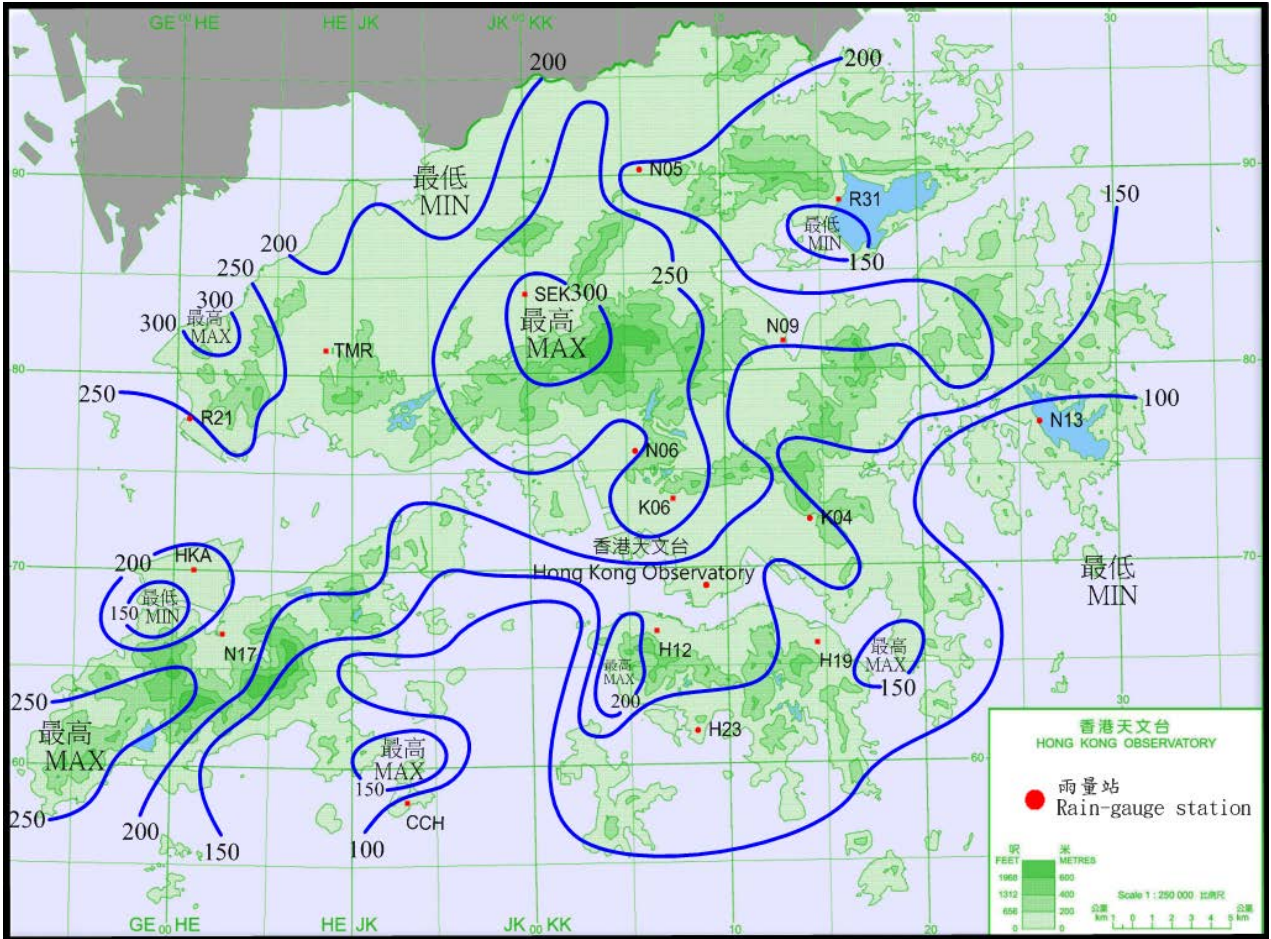


圖 3.5.3 二零一八年九月十四日至十七日的雨量分佈(等雨量線單位為毫米)。  
 Figure 3.5.3 Rainfall distribution on 14 - 17 September 2018 (isohyets in millimetres).

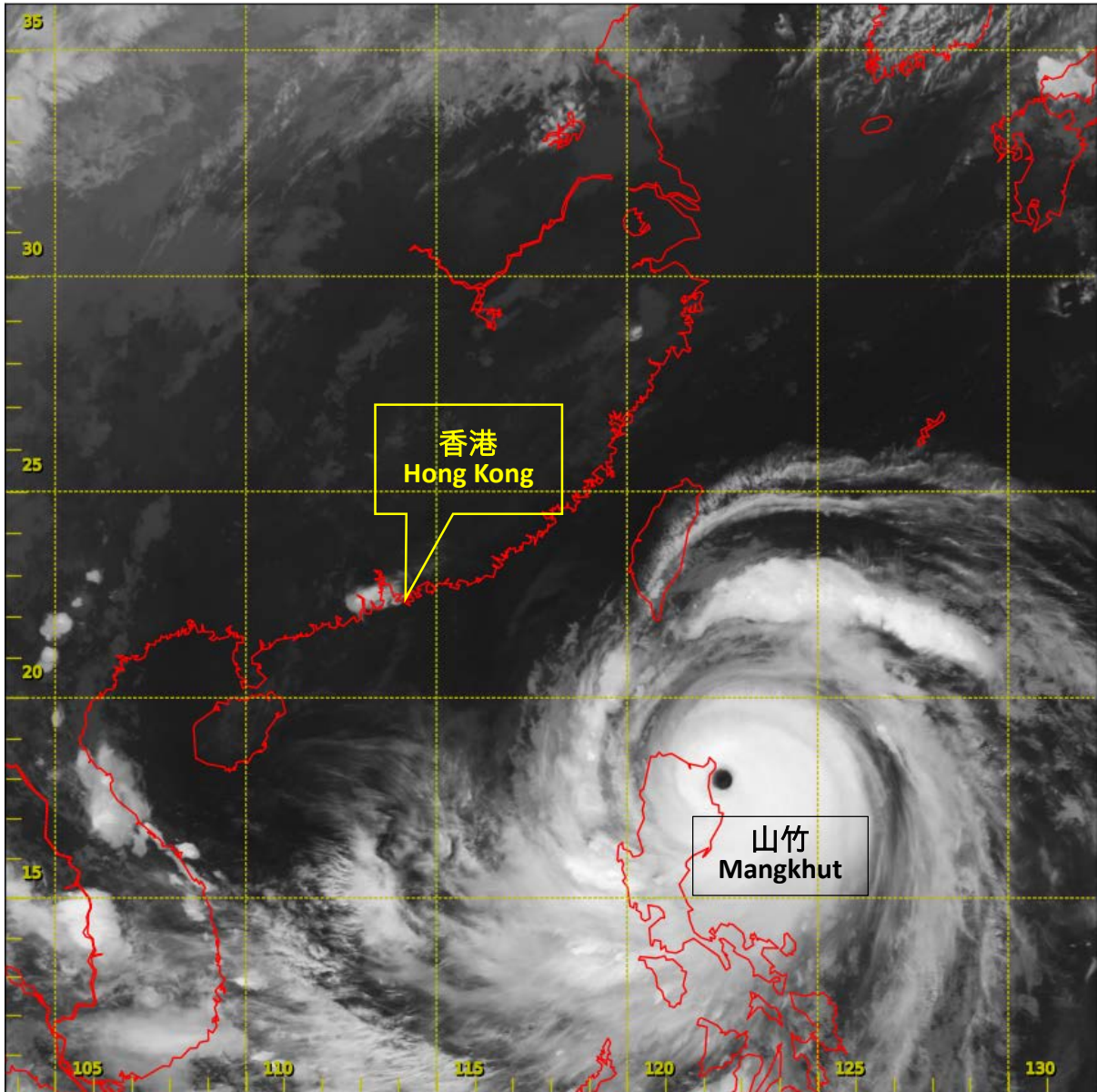


圖 3.5.4a 二零一八年九月十五日上午 1 時左右的紅外線衛星圖片，當時山竹達到其最高強度，中心附近最高持續風速估計為每小時 250 公里

Figure 3.5.4a Infra-red satellite imagery around 1 a.m. on 15 September 2018, when Mangkhut was at peak intensity with estimated maximum sustained winds of 250 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).]

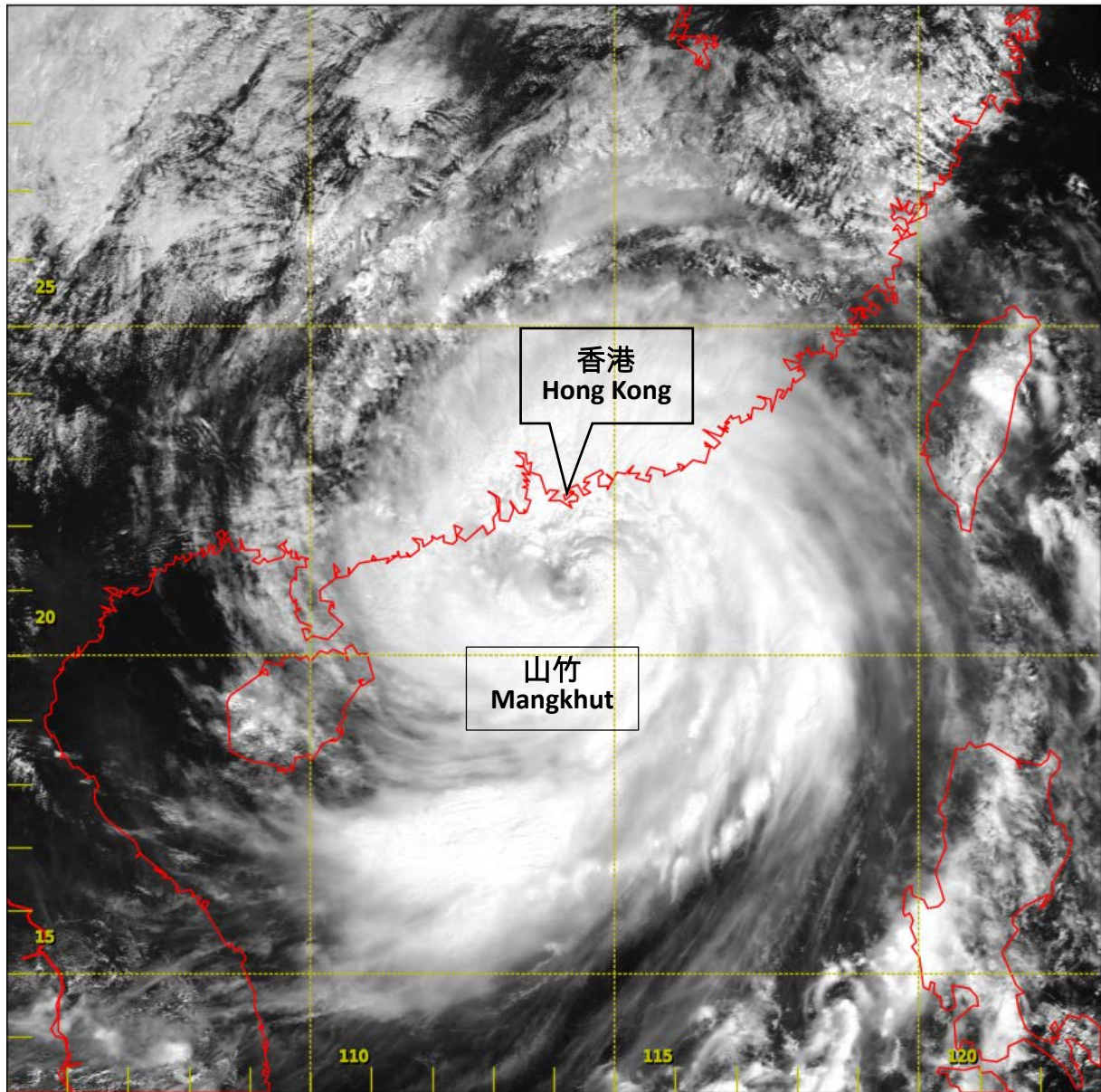


圖 3.5.4b 二零一八年九月十六日上午 11 時左右的可見光衛星圖片，山竹廣闊的環流覆蓋南海北部及華南沿岸地區。

Figure 3.5.4b Visible satellite imagery around 11 a.m. on 16 September 2018. The extensive circulation of Mangkhut covered the northern part of the South China Sea and south China coastal areas.

[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).]

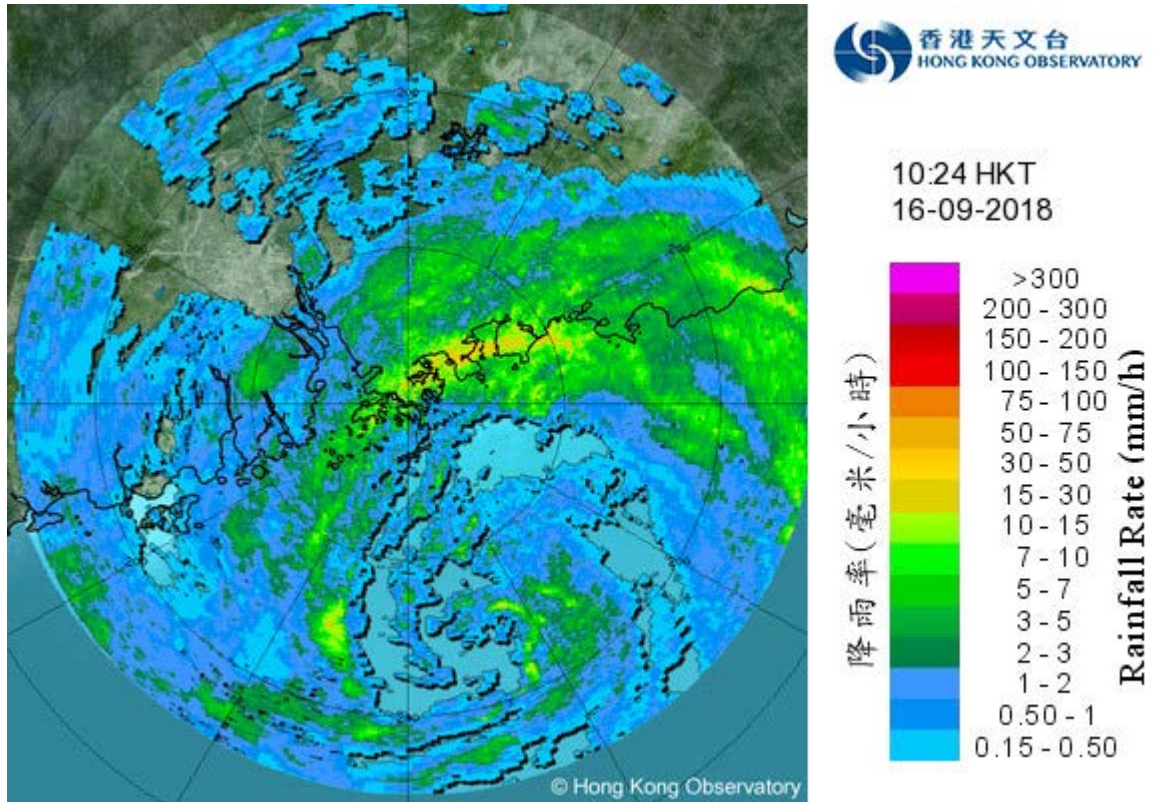


圖 3.5.5a 二零一八年九月十六日上午 10 時 24 分的雷達回波圖像，當時山竹的強烈螺旋雨帶正影響香港。

Figure 3.5.5a Image of radar echoes at 10:24 a.m. on 16 September 2018. The intense spiral rainband of Mangkhut was affecting Hong Kong at that time.

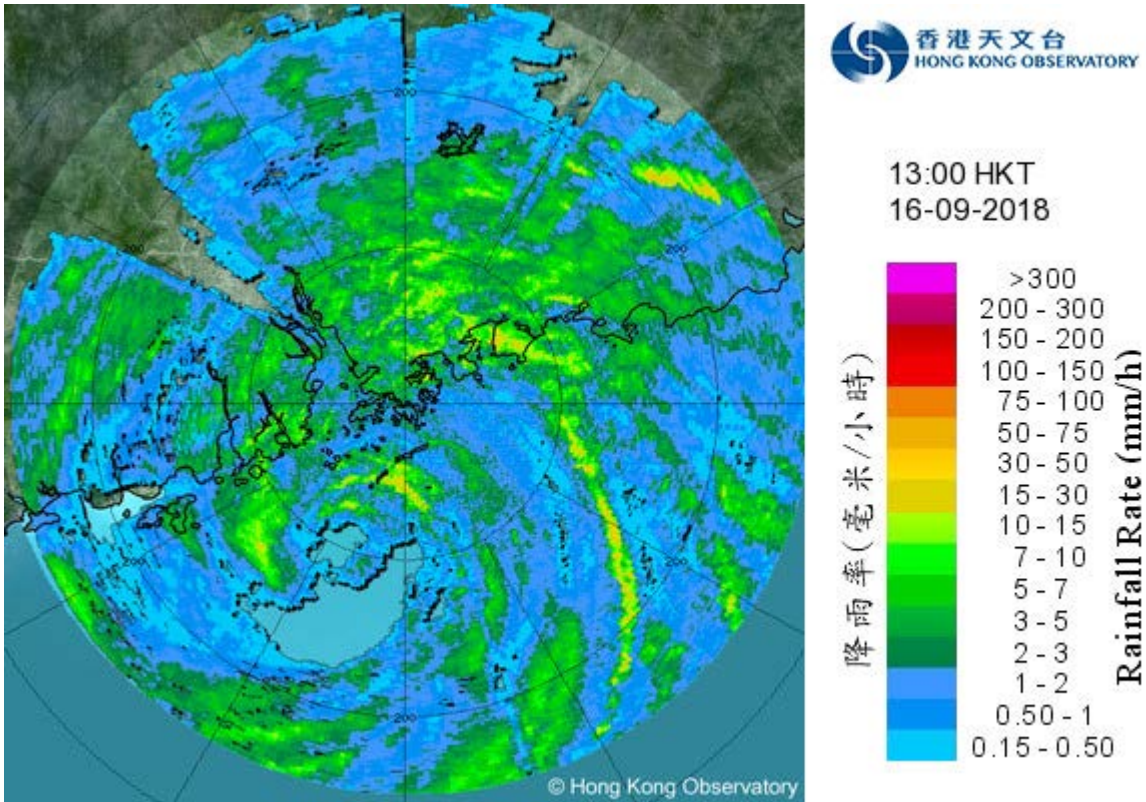


圖 3.5.5b 二零一八年九月十六日下午 1 時的雷達回波圖像，當時山竹最接近香港，其中心在天文台總部的西南偏南約 100 公里。

Figure 3.5.5b Image of radar echoes at 1 p.m. on 16 September 2018 when Mangkhut was closest to Hong Kong, with its centre located about 100 km south-southwest of the Observatory Headquarters.

### 山竹風力結構的變化 / Change of Wind Structure of Mangkhut

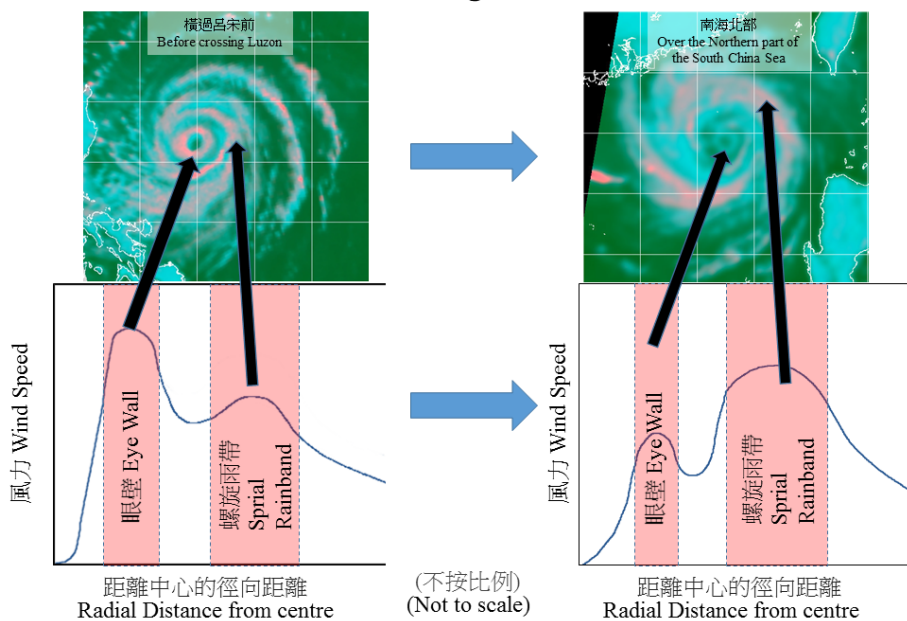


圖 3.5.6 山竹在橫過呂宋前及在南海北部風力結構變化的示意圖。

Figure 3.5.6 Diagram illustrating the change of wind structure of Mangkhut before crossing Luzon and over the northern part of the South China Sea.

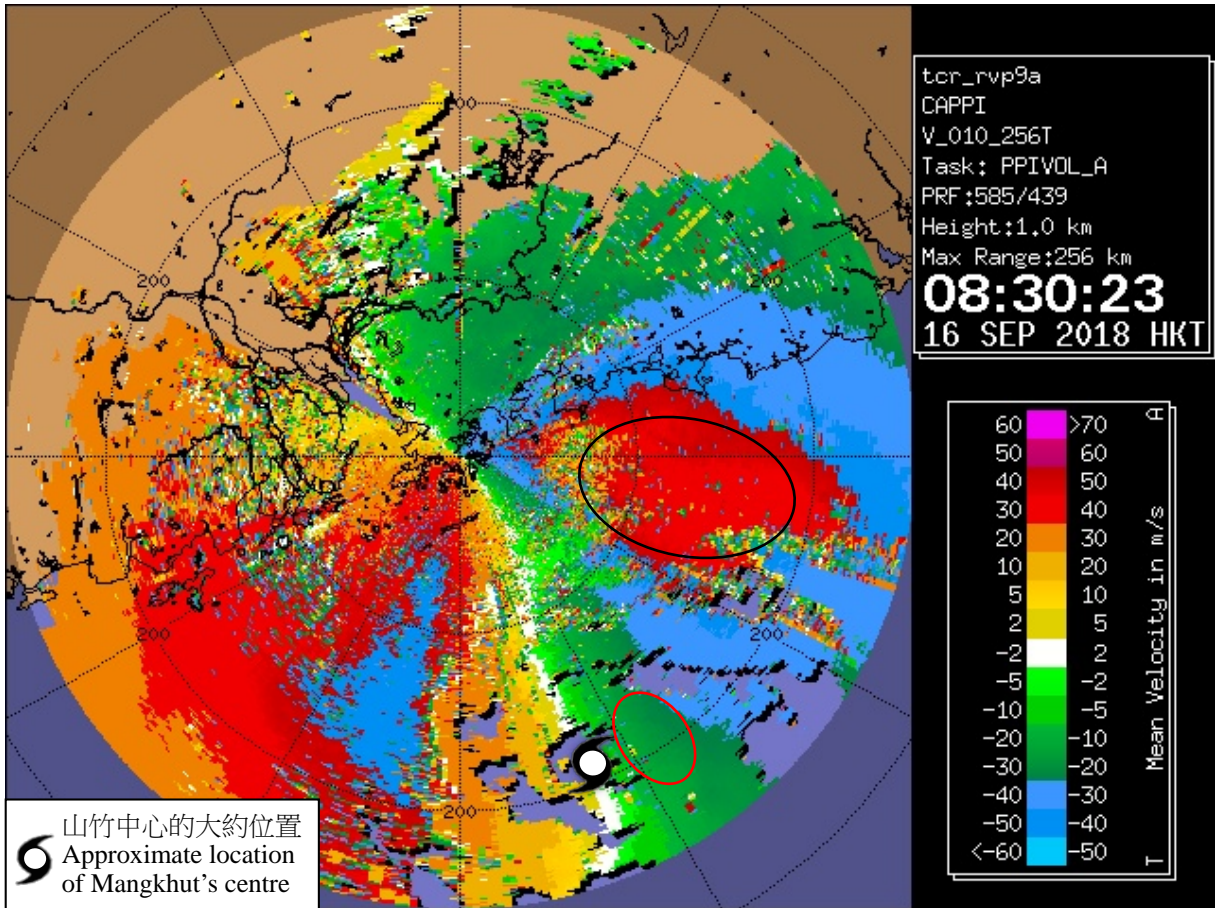


圖 3.5.7 二零一八年九月十六日上午 8 時 30 分的多普勒雷達回波圖像，顯示在 1 公里高度的徑向風(即雨區在雷達方向的速度，正(負)速度表示雨區遠離(接近)雷達)。圖像顯示山竹外圍螺旋雨帶的徑向風較眼壁的徑向風大。

Figure 3.5.7 Radar imagery showing the Doppler velocity at 8:30 a.m. on 16 September 2018. The image revealed the radial winds at 1 km (i.e. the velocity of rain echoes relative to the radar, and positive (negative) values indicates rain echoes moving away from (towards) the radar). The image showed that the radial wind over the outer spiral rainband was higher than that near the eyewall.

註：要注意的是多普勒天氣雷達速度探測範圍的限制。而最大可探測的速度稱為最大不模糊速度。大老山天氣雷達的最大不模糊速度為每秒 45.1 米。假若徑向風超過了最大不模糊速度，便會出現速度折疊的現象，速度會由正數(負數)每秒 45.1 米轉為負數(正數)每秒 45.1 米。

以山竹外圍螺旋雨帶 (即黑色圈部分)作為例子，圖中直接讀出的徑向風介乎每秒正 30 至 40 米(正數表示遠離雷達)，但事實上該雨區正移近雷達。經折疊修正之後，在雨區 1 公里高度的實際徑向風應介乎每秒負 50.1 米至負 60.1 米。相反在眼壁附近的雨區(紅色圈部分)並無出現速度折疊現象，徑向風介乎每秒負 20 至 30 米。

Note: Please note the constraint of the range of the velocity detected by Doppler radar. The maximum detectable speed is called Nyquist velocity. The Nyquist velocity of Tate's Cairn Weather Radar is 45.1 m/s. If the radial wind exceeds the Nyquist velocity, there will be velocity

folding, and the radial speed will change from positive (negative) 45.1 m/s to negative (positive) 45.1 m/s.

Using the spiral rainband of Mangkhut (circled in black) as an example, the radial wind read directly from the figure ranged between +30 and +40 m/s (positive value means moving away from radar). In fact the rain echoes were moving towards the radar. After adjusting for the folding, the actual radial wind of the rain echoes at a height 1 km should range from -50.1 m/s to -60.1 m/s. In contrast, there was no velocity folding of the rain echoes near the eyewall (circled in red), and the radial wind ranged between -20 and -30 m/s.



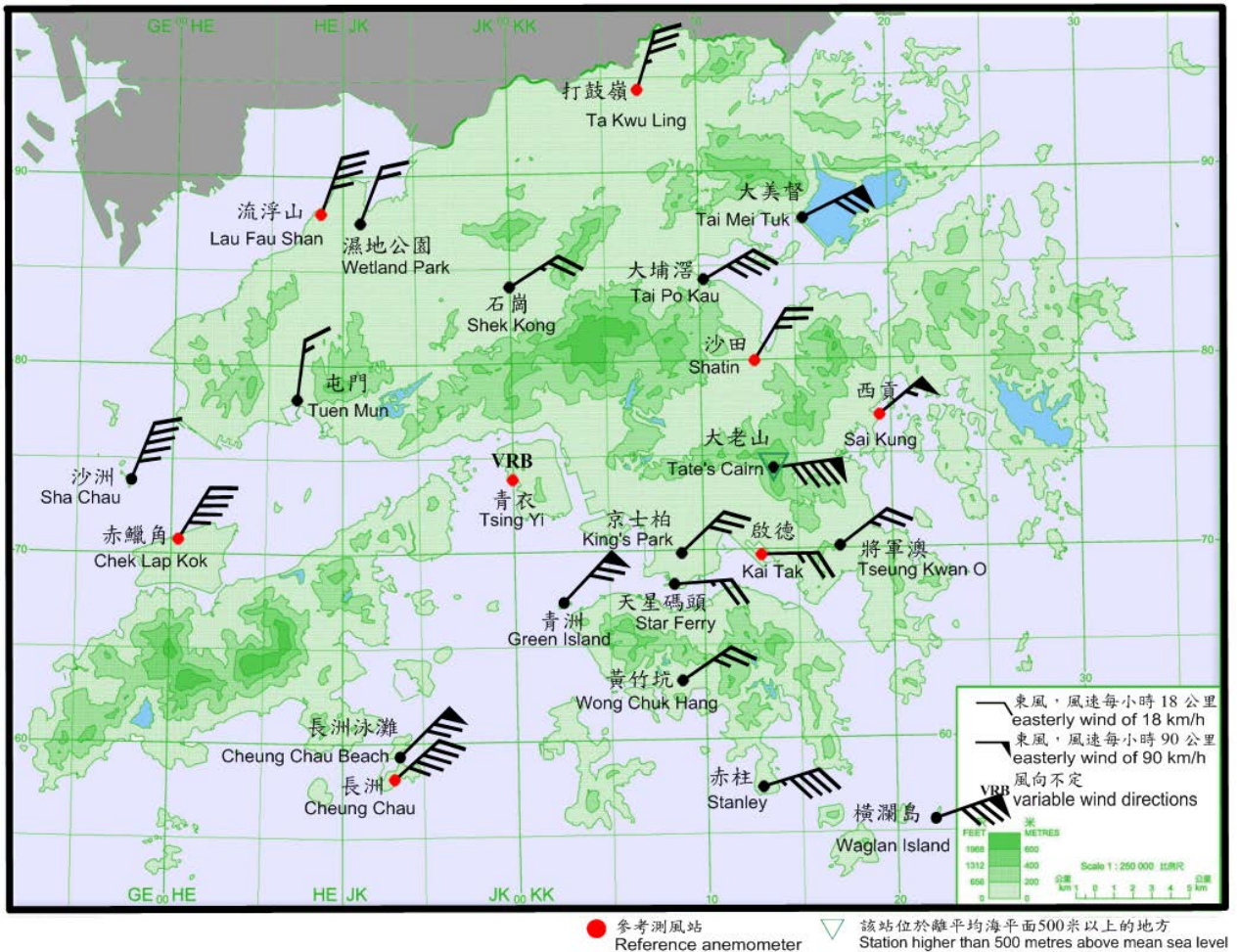


圖 3.5.8a 二零一八年九月十六日上午 11 時正香港各站錄得的十分鐘平均風向和風速。當時長洲泳灘、大老山、大美督、青洲及橫瀾島的風力達到颶風程度。

Figure 3.5.8a 10-minute mean wind direction and speed recorded at various stations in Hong Kong at 11 a.m. on 16 September 2018. Winds reached hurricane force at Cheung Chau Beach, Tate's Cairn, Tai Mei Tuk, Green Island and Waglan Island at that time.

註： 青衣當時錄得的十分鐘平均風速為每小時 27 公里。

Note: The 10-minute mean wind speeds recorded at the time at Tsing Yi was 27 km/h.

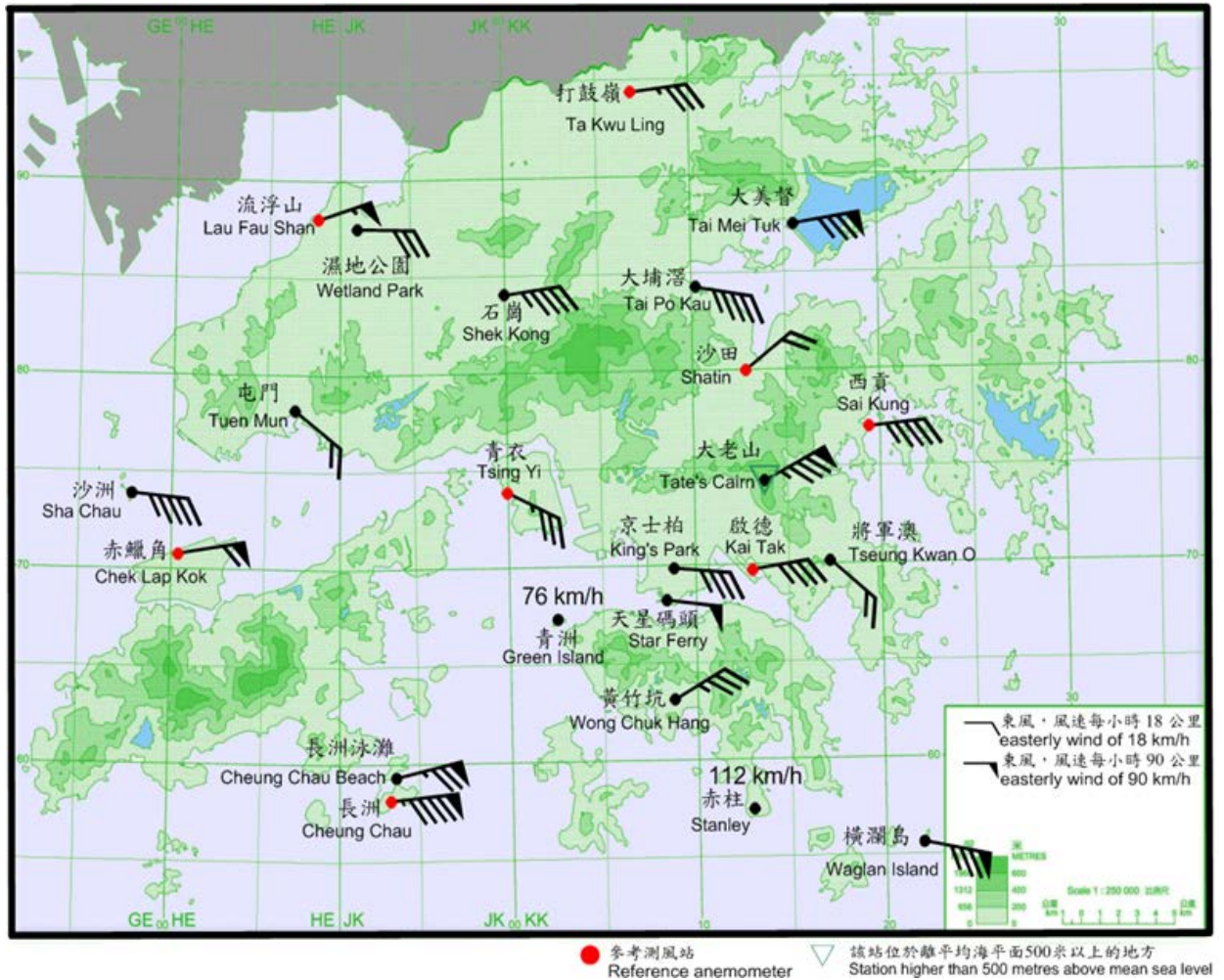


圖 3.5.8b 二零一八年九月十六日下午 2 時正香港各站錄得的十分鐘平均風向和風速。當時長洲、長洲泳灘、大老山、大美督及橫瀾島的風力達到颶風程度。

Figure 3.5.8b 10-minute mean wind direction and speed recorded at various stations in Hong Kong at 2 p.m. on 16 September 2018. Winds reached hurricane force at Cheung Chau, Cheung Chau Beach, Tate's Cairn, Tai Mei Tuk and Waglan Island at that time.

註： 青洲及赤柱當時只有風速數據。

Note: Only wind speeds were available at Green Island and Stanley at that time.

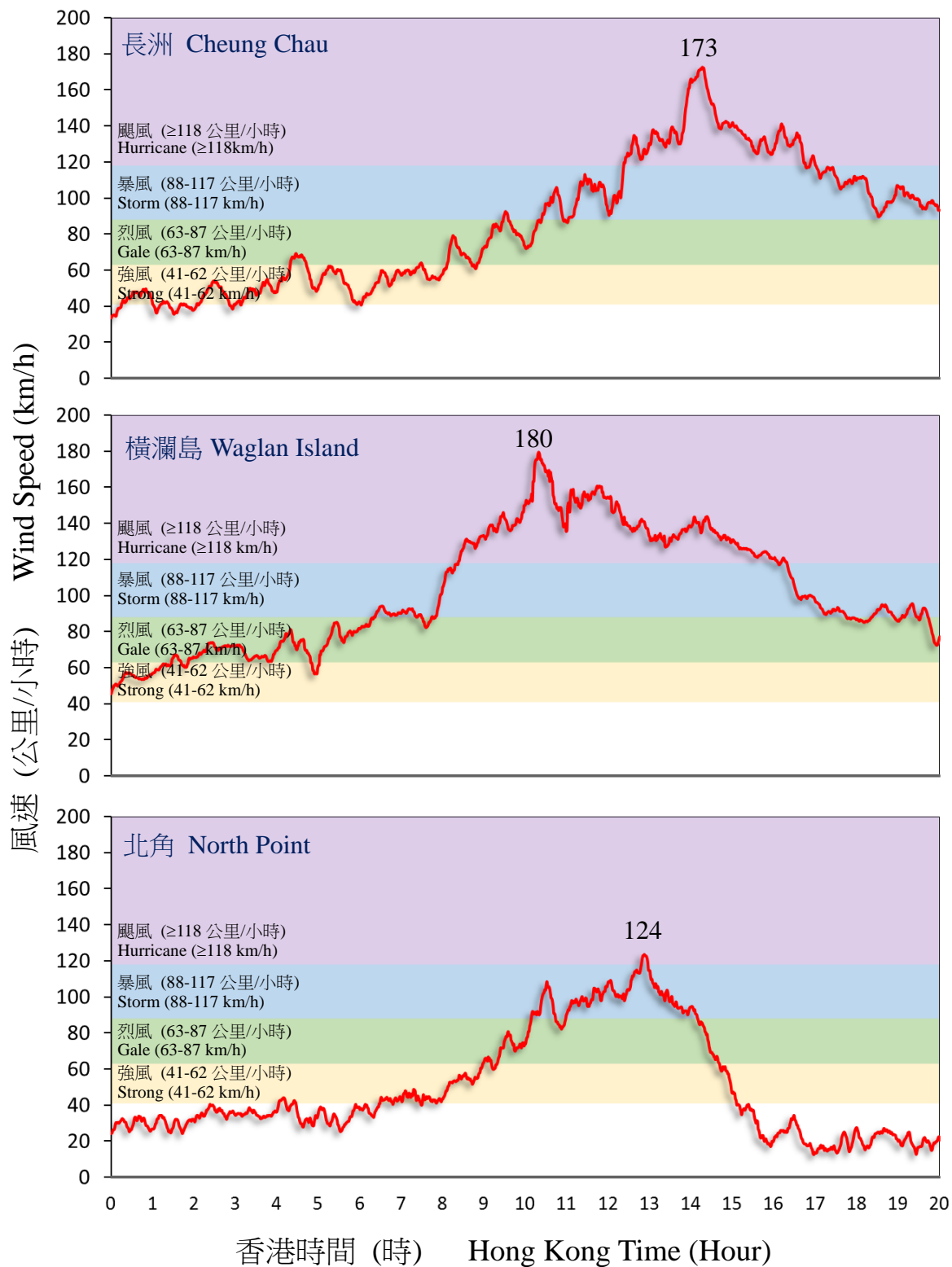


圖 3.5.9 二零一八年九月十六日在長洲、橫瀾島及北角錄得的十分鐘平均風速。  
 Figure 3.5.9 Traces of 10-minute mean wind speed at Cheung Chau, Waglan Island and North Point on 16 September 2018.

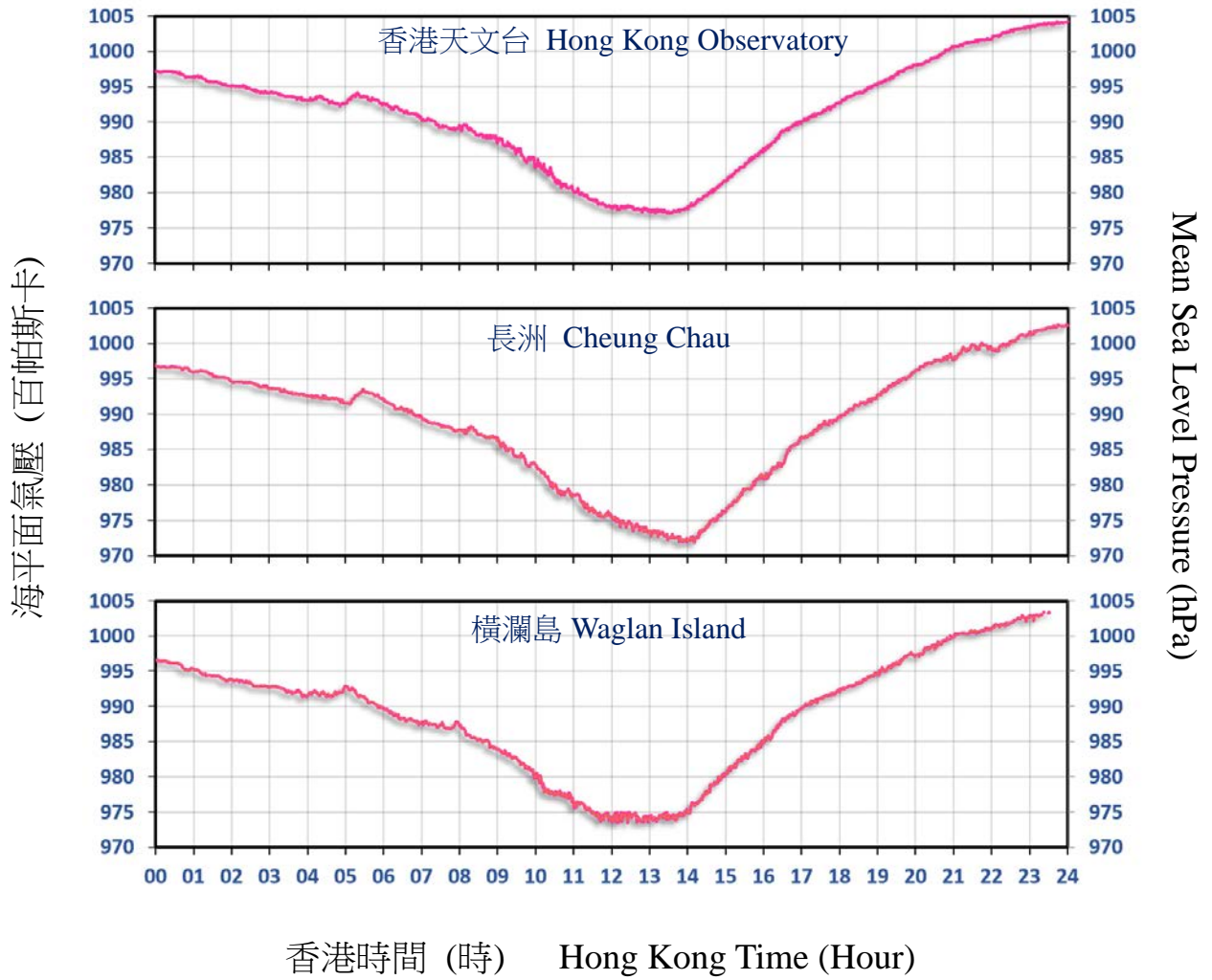


圖 3.5.10 二零一八年九月十六日香港天文台、長洲及橫瀾島錄得的海平面氣壓。  
 Figure 3.5.10 Traces of mean sea-level pressure recorded at the Hong Kong Observatory, Cheung Chau and Waglan Island on 16 September 2018.

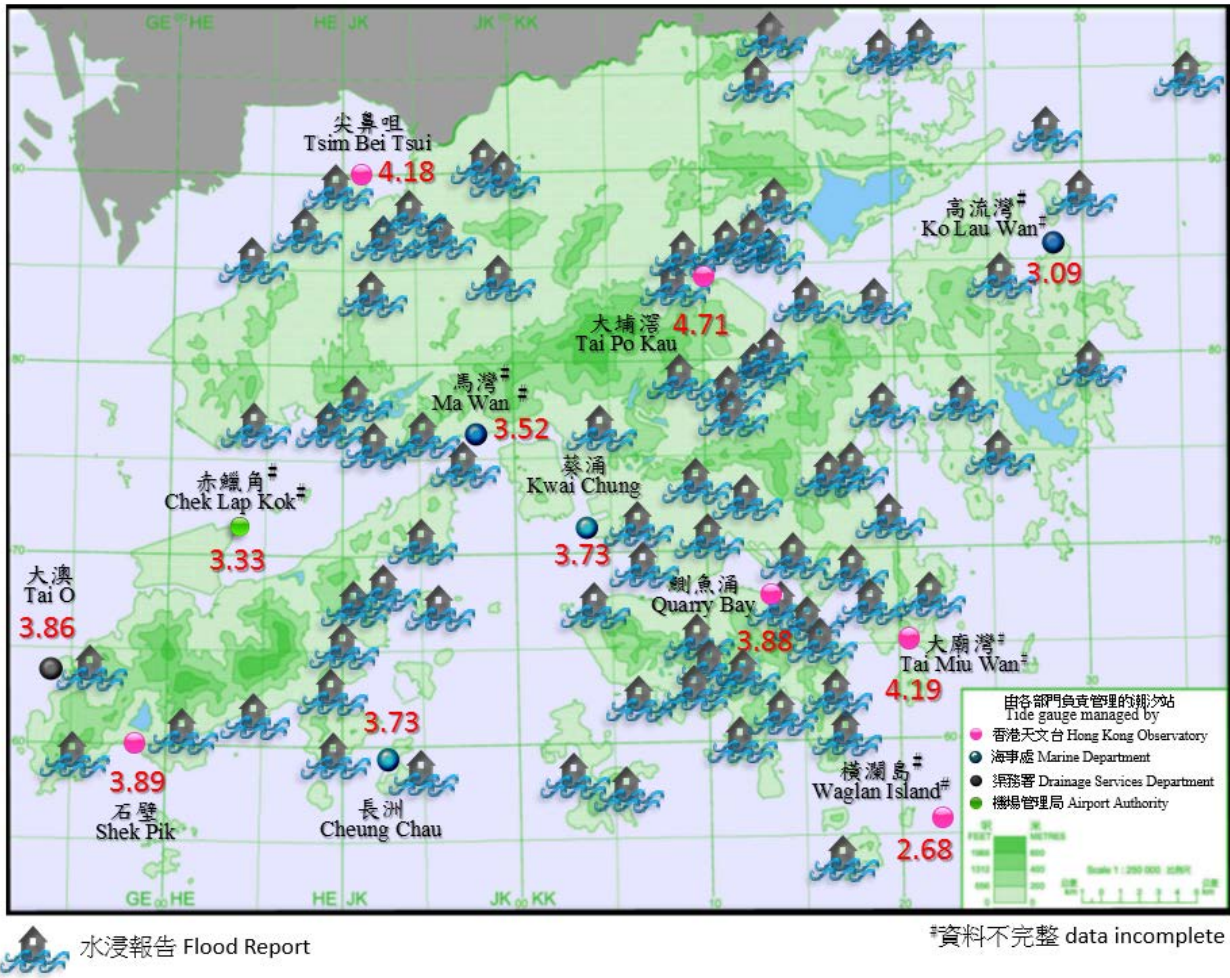


圖 3.5.11 二零一八年九月十六日香港各潮汐站錄得的最高潮位(單位為米，海圖基準面以上)及水浸報告。根據政府部門、新聞及社交媒體的資料，並非詳盡無遺。

Figure 3.5.11 Maximum sea level (metres above Chart Datum) recorded at various tide gauges in Hong Kong and flood reports from government departments, news and social media on 16 September 2018. The flood reports are not exhaustive.

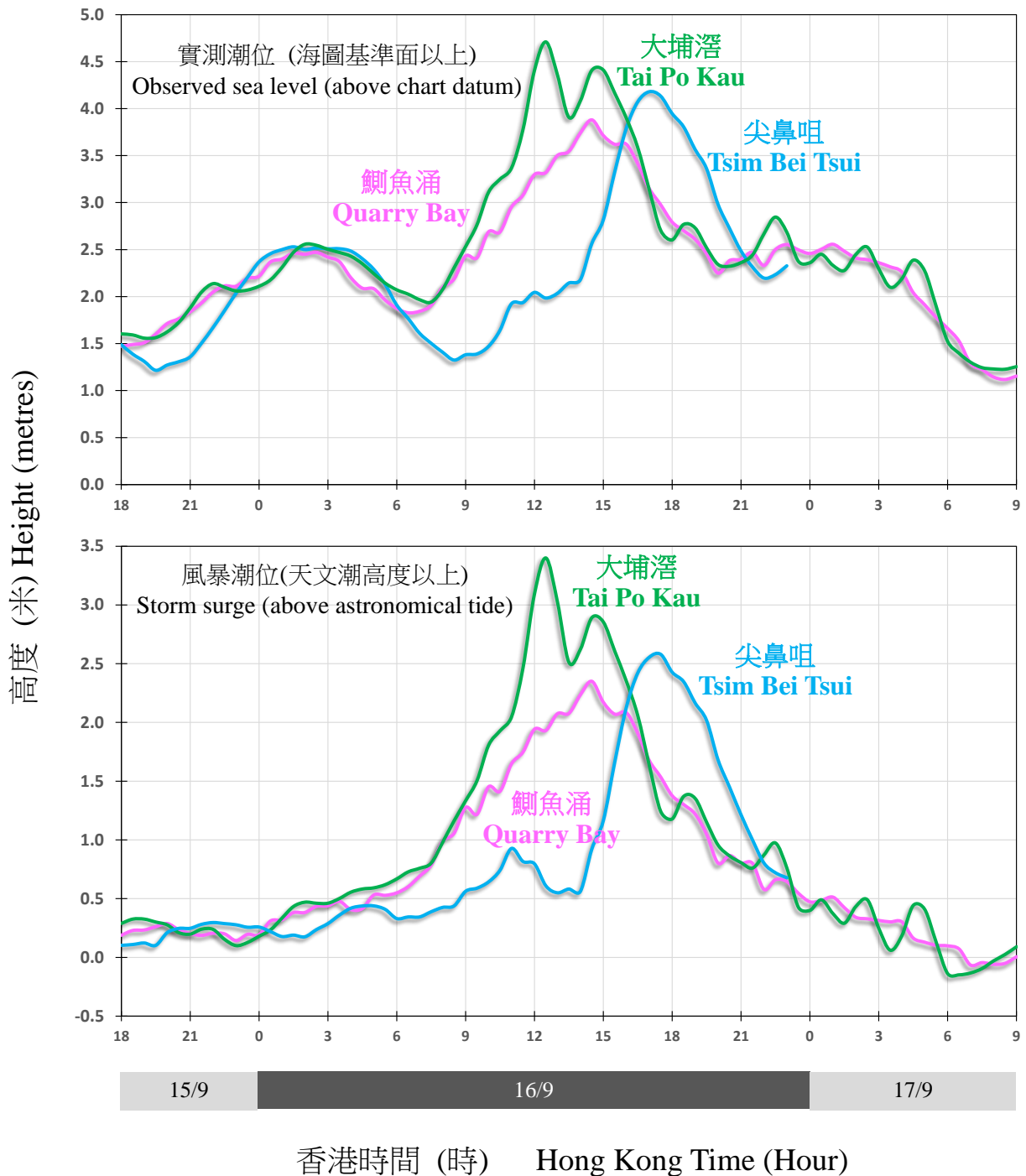


圖 3.5.12 二零一八年九月十五至十七日在鰂魚涌、大埔滘及尖鼻咀錄得的潮位(海圖基準面以上)及風暴潮(天文潮高度以上)。

Figure 3.5.12 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 15-17 September 2018.

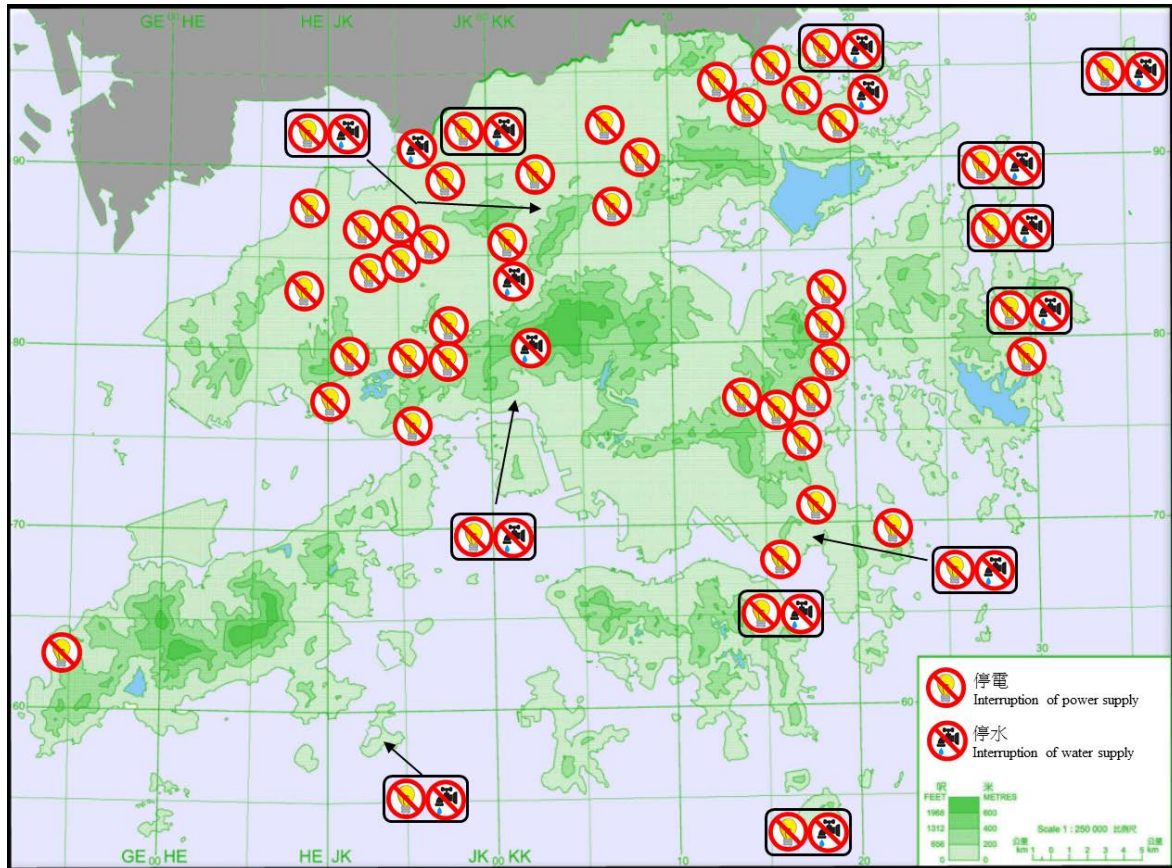


圖 3.5.13 在山竹的影響下，有關電力及食水中斷的報告。根據政府部門、新聞及社交媒體的資料，並非詳盡無遺。

Figure 3.5.13 Reports of interruption of power and water supply under the influence of Mangkhut based on government departments, news and social media. The incident reports are not exhaustive.



沙田 Sha Tin  
(鳴謝 MCW 提供相片 Courtesy of MCW)



黃大仙 Wong Tai Sin  
(鳴謝鄭向龍提供相片 Courtesy of 鄭向龍)



觀塘 Kwun Tong  
(鳴謝李子祥提供相片 Courtesy of TC Lee)



小西灣 Siu Sai Wan  
(鳴謝 Dickson Ho 提供相片 Courtesy of Dickson Ho)



樂富 Lok Fu  
(鳴謝 Andy Lam 提供相片 Courtesy of Andy Lam)



屯門 Tuen Mun  
(鳴謝呂大年提供相片 Courtesy of 呂大年)

圖 3.5.14 山竹襲港期間本港多處有樹木倒塌。  
Figure 3.5.14 The passage of Mangkhut resulted in fallen trees in many parts of the territory.





九龍灣 Kowloon Bay  
(鳴謝 Andy Ho 提供相片 Courtesy of Andy Ho)



長洲 Cheung Chau  
(鳴謝龔穎恒提供相片 Courtesy of T Kung)



中環 Central  
(鳴謝龔穎恒提供相片 Courtesy of T Kung)



愉景灣 Discovery Bay  
(鳴謝龔穎恒提供相片 Courtesy of T Kung)

圖 3.5.14 (續)

Figure 3.5.14 (Cont'd)



啟德 Kai Tak

(鳴謝 Andy Ho 提供相片 Courtesy of Andy Ho)



九龍灣 Kowloon Bay

(鳴謝 Andy Ho 提供相片 Courtesy of Andy Ho)



天水圍 Tin Shui Wai

(鳴謝 Helen Ho 提供相片 Courtesy of Helen Ho)



廣播道 Broadcast Drive

(鳴謝周偉基提供相片 Courtesy of Chow Wai Ki)



新蒲崗 San Po Kong

(鳴謝馮俊傑提供相片 Courtesy of 馮俊傑)



彩虹邨 Choi Hung Estate

(鳴謝 Andy Ho 提供相片 Courtesy of Andy Ho)

圖 3.5.15 山竹襲港期間本港多處地區受猛風破壞。

Figure 3.5.15 Widespread damages by ferocious winds during the passage of Mangkhut.



中西區 Central and Western District  
(鳴謝江鴻銘提供相片 Courtesy of 江鴻銘)



中西區 Central and Western District  
(鳴謝 Andrew Mak 提供相片 Courtesy of Andrew Mak)



西灣河 Sai Wan Ho  
(鳴謝 Stephanie Lo 提供相片 Courtesy of Stephanie Lo)



西流江 Sai Lau Kong  
(鳴謝尹文亮提供相片 Courtesy of 尹文亮)

圖 3.5.15 (續)

Figure 3.5.15 (Cont'd)



天文台總部 Observatory Headquarters  
(鳴謝岑智明提供相片 Courtesy of C M Shun)



荃灣 Tsuen Wan  
(鳴謝 K T Lau 提供相片 Courtesy of K T Lau)



西貢 Sai Kung  
(鳴謝蔡振榮提供相片 Courtesy of CW Choy)



荔枝角道 Lai Chi Kok Road  
(鳴謝 Ryan Leung 提供相片 Courtesy of Ryan Leung)

圖 3.5.15 (續)

Figure 3.5.15 (Cont'd)



紅磡 Hung Hom  
(鳴謝吳耀華提供相片 Courtesy of Y W Ng)



旺角 Mong Kok  
(鳴謝鄧先生提供相片 Courtesy of 鄧先生)

圖 3.5.16 山竹襲港期間玻璃幕牆被吹毀。  
Figure 3.5.16 Shattered Glass Curtain Walls during the passage of Mangkhut.



中環 Central

(鳴謝岑智明提供相片 Courtesy of C M Shun)



灣仔 Wan Chai

(鳴謝岑智明提供相片 Courtesy of C M Shun)



灣仔 Wan Chai

(鳴謝 Shirley Yang 提供相片 Courtesy of Shirley Yang)

圖 3.5.16 (續)

Figure 3.5.16 (Cont'd)



鴨脷洲海怡半島 South Horizons, Ap Lei Chau  
(鳴謝 H C Chan 提供相片 Courtesy of H C Chan)



杏花邨 Heng Fa Chuen  
(鳴謝 Fong Wai 提供相片 Courtesy of Fong Wai)

圖 3.5.17 山竹襲港期間巨浪拍岸。  
Figure 3.5.17 High waves affected coastal areas during the passage of Mangkhut.



沙田 Sha Tin  
(鳴謝 Anson Tang 提供相片 Courtesy of Anson Tang)



沙田 Sha Tin  
(鳴謝 Leo Chan 提供相片 Courtesy of Leo Chan)



沙田 Sha Tin  
(鳴謝 Leo Chan 提供相片 Courtesy of Leo Chan)



杏花邨 Heng Fa Chuen  
(鳴謝 Dickson Ho 提供相片 Courtesy of Dickson Ho)



杏花邨 Heng Fa Chuen  
(鳴謝 David Leung 提供相片 Courtesy of David Leung)

圖 3.5.18 山竹襲港期間，風暴潮帶來的水浸和破壞。

Figure 3.5.18 Flooding and damage caused by storm surge during the passage of Mangkhut.





吉澳 Kat O  
(鳴謝 Mr Shek 提供相片 Courtesy of Mr Shek)



坪洲 Peng Chau  
(鳴謝鍾佩琪提供相片 Courtesy of 鍾佩琪)



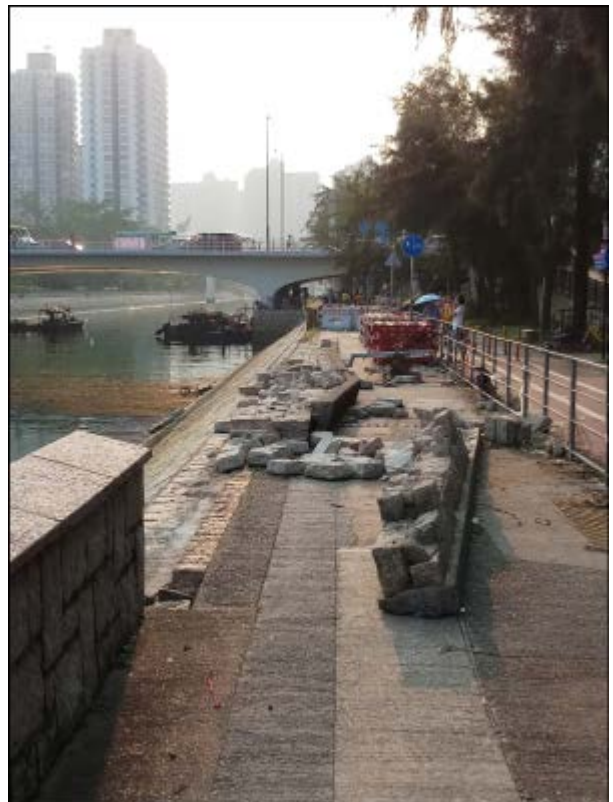
東平洲 Tung Ping Chau  
(鳴謝林學賢提供相片 Courtesy of David Lam)



深水灣 Deep Water Bay  
(鳴謝 Tsui Sai Kung 提供相片 Courtesy of Tsui Sai Kung)



橫瀾島 Waglan Island  
(鳴謝余才來提供相片 Courtesy of C L Yu)



大埔 Tai Po  
(鳴謝 Andy Ho 提供相片 Courtesy of Andy Ho)

圖 3.5.18 (續)

Figure 3.5.18 (Cont'd)



長洲 Cheung Chau  
(鳴謝龔穎恒提供相片 Courtesy of T Kung)



梅窩碼頭 Mui Wo Pier  
(鳴謝 Mo Wong 提供相片 Courtesy of Mo Wong)



小西灣運動場 Siu Sai Wan Sports Ground  
(鳴謝 Lee Yuen Nar Susanna 提供相片 Courtesy of Lee Yuen Nar Susanna)

圖 3.5.18 (續)

Figure 3.5.18 (Cont'd)



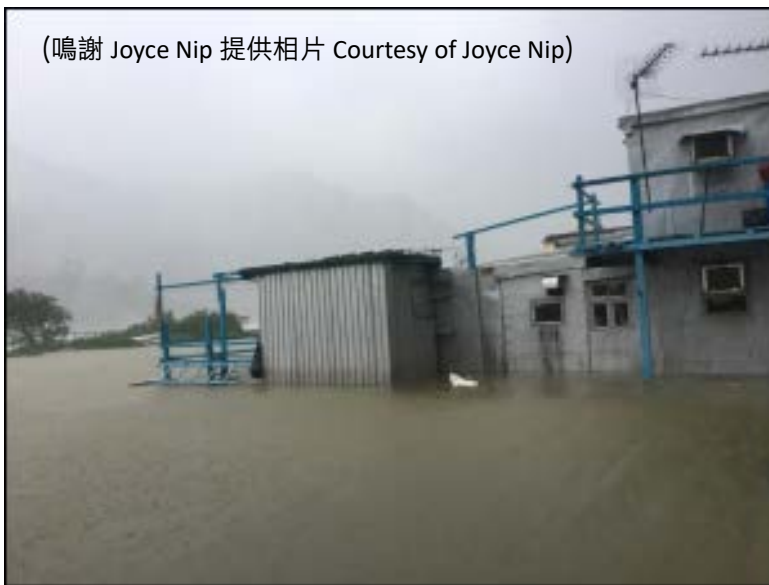
將軍澳南海濱長廊 Tseung Kwan O South Waterfront Promenade

圖 3.5.18 (續)

Figure 3.5.18 (Cont'd)



(鳴謝民安隊提供相片 Courtesy of CAS)



(鳴謝 Joyce Nip 提供相片 Courtesy of Joyce Nip)

大澳 Tai O



(鳴謝 Joyce Nip 提供相片 Courtesy of Joyce Nip)

圖 3.5.18 (續)

Figure 3.5.18 (Cont'd)



(鳴謝 Angie Lee 提供相片 Courtesy of Angie Lee)



(鳴謝 S S Wong 提供相片 Courtesy of S S Wong)



(鳴謝 Brain Tse 提供相片 Courtesy of Brain Tse)



(鳴謝 Mr Tsui 提供相片 Courtesy of Mr Tsui)

### 西貢 Sai Kung

圖 3.5.19 山竹襲港期間有船隻擱淺、沉沒或受嚴重破壞。

Figure 3.5.19 Vessels of various sizes were stranded, sunk or seriously damaged during the passage of Mangkhut.



石澳 Shek O  
(鳴謝林學賢提供相片 Courtesy of David Lam)



沙田 Sha Tin  
(鳴謝陳兆偉提供相片 Courtesy of Wallace Chan)

圖 3.5.19 (續)

Figure 3.5.19 (Cont'd)