

3.3 強烈熱帶風暴白鹿 (1911)：二零一九年八月二十一日至二十六日

白鹿是二零一九年第三個影響香港的熱帶氣旋。

熱帶低氣壓白鹿於八月二十一日下午在高雄之東南偏東約1 460公里的北太平洋西部上形成，初時向西移動。翌日白鹿增強為熱帶風暴，下午開始採取西北路徑移向台灣南部。當晚白鹿進一步增強為強烈熱帶風暴，八月二十三日晚上達到其最高強度，中心附近最高持續風速估計為每小時105公里。白鹿於八月二十四日橫過台灣南部，其後採取西北偏西路徑橫過台灣海峽。翌日早上白鹿在福建登陸並減弱為熱帶風暴，日間繼續移入內陸，八月二十六日凌晨在廣東內陸減弱為低壓區。

八月二十四日白鹿橫過台灣南部後，香港天文台在當日下午2時40分發出一號戒備信號，當時白鹿集結在香港以東約650公里。下午本港吹和緩至清勁的偏西風。受白鹿的外圍下沉氣流影響，本港下午天氣酷熱及有煙霞。與白鹿相關的強雷雨帶於八月二十五日凌晨為本港帶來頻密的雷暴及狂風，長洲泳灘及大埔滘曾分別錄得每小時104及85公里的陣風。在八月二十五日午夜至上午二時，本港境內錄得接近4 000次雲對地閃電。天文台需要發出黃色暴雨警告。雖然八月二十五日日間白鹿移入內陸及減弱，但仍繼續靠近本港。日間本港吹和緩至清勁西南風，離岸及高地間中吹強風。隨著白鹿進一步減弱及本地風勢緩和，天文台在八月二十五日晚上7時20分取消所有熱帶氣旋警告信號。白鹿於八月二十五日晚上8時最接近香港，其中心在本港以北約280公里掠過。與白鹿相關的雨帶於八月二十六日凌晨為本港帶來大雨及狂風雷暴，天文台曾發出紅色暴雨警告。總括來說，八月二十五日至二十六日本港大部分地區錄得超過150毫米雨量，市區的雨量更超過250毫米。

白鹿影響香港期間，尖鼻咀錄得最高潮位(海圖基準面以上) 2.27米及最大風暴潮(天文潮高度以上) 0.22米。天文台總部於八月二十五日上午3時07分錄得最低瞬時海平面氣壓999.0百帕斯卡。

八月二十五日凌晨香港受頻密狂風雷暴影響期間，港鐵東鐵線有塌樹壓毀架空電纜，引致服務受阻。本港多區亦出現電壓驟降，電力供應受影響。

根據報章報導，白鹿吹襲台灣期間造成至少一人死亡和九人受傷，逾10萬戶停電。福建亦有至少44萬戶停電，陸空交通受影響。

表3.3.1 - 3.3.3 分別是白鹿影響香港期間各站錄得的最高風速、香港的日雨量及最高潮位資料。圖3.3.1 - 3.3.2 分別為白鹿的路徑圖及本港的雨量分佈圖。圖3.3.3 為白鹿的衛星圖像。圖3.3.4 - 3.3.5 分別為白鹿影響香港期間各站錄得的最高陣風及雲對地閃電分佈圖。圖3.3.6 為在元朗拍攝的閃電圖像。圖3.3.7 為白鹿的雷達圖像。

3.3 Severe Tropical Storm Bailu (1911): 21 – 26 August 2019

Bailu was the third tropical cyclone affecting Hong Kong in 2019.

Bailu formed as a tropical depression over the western North Pacific about 1 460 km east-southeast of Gaoxiong on the afternoon of 21 August and drifted westwards at first. Bailu intensified into a tropical storm on 22 August and started to take on a northwesterly course towards the southern part of Taiwan in the afternoon. Bailu further intensified into a severe tropical storm that night. It reached its peak intensity on the night of 23 August with an estimated maximum sustained wind of 105 km/h near its centre. After sweeping across the southern part of Taiwan on 24 August, Bailu moved across the Taiwan Strait. It made landfall over Fujian the next morning and weakened into a tropical storm. Bailu moved further inland during the day and weakened into an area of low pressure over inland Guangdong on the small hours of 26 August.

After Bailu sweeping across the southern part of Taiwan on 24 August, the Hong Kong Observatory issued the Standby Signal No. 1 at 2:40 p.m. when Bailu was about 650 km east of Hong Kong. Local winds were moderate to fresh westerly. Affected by the outer subsiding air of Bailu, the weather was very hot with haze in Hong Kong in the afternoon. Bands of intense thundery showers associated with Bailu brought frequent thunderstorms and squalls to Hong Kong on the small hours of 25 August. Gusts of 104 and 85 km/h were once recorded at Cheung Chau Beach and Tai Po Kau respectively. Nearly 4000 cloud-to-ground lightning strokes were also recorded in Hong Kong between midnight and 2 a.m. on 25 August. The Amber Rainstorm Warning Signal was issued by the Observatory. Although Bailu moved inland and weakened during the day on 25 August, it still edged closer to Hong Kong. Local winds were moderate to fresh southwesterly during the day, occasionally reaching strong force offshore and on high ground. With Bailu weakening further and local winds moderating, all tropical cyclone warning signals were cancelled at 7:20 p.m. on 25 August. Bailu came closest to Hong Kong at around 8 p.m. on 25 August when it was around 280 km north of the territory. The rainbands associated with Bailu brought heavy downpour and squally thunderstorms to Hong Kong in the small hours on 26 August, necessitating the issuance of the Red Rainstorm Warning. Overall, more than 150 millimetres of rainfall were generally recorded over most parts of the territory on 25 and 26 August, with rainfall exceeding 250 millimetres over the urban areas.

Under the influence of Bailu, a maximum sea level (above chart datum) of 2.27 m and a maximum storm surge (above astronomical tide) of 0.22 m were recorded at Tsim Bei Tsui. The lowest instantaneous mean sea-level pressure of 999.0 hPa was recorded at the Observatory headquarters at 3:07 a.m. on 25 August.

When Hong Kong was hammered by frequent squally thunderstorms on the small hours of 25 August, the overhead cables of the East Rail of MTR were damaged by fallen trees, causing disruption to the train services. The power supply over many places was also affected because of the voltage dip.

According to press reports, Bailu caused at least one death and nine injuries to Taiwan during its passage. Over 100 000 households were without electricity supply. In Fujian, electricity supply to over 440 000 households was also interrupted. Air and land

transportations were affected.

Information on the maximum wind, daily rainfall and maximum sea level reached in Hong Kong during the passage of Bailu is given in Tables 3.3.1 - 3.3.3 respectively. Figures 3.3.1 - 3.3.2 show respectively the track of Bailu and the rainfall distribution for Hong Kong. Figure 3.3.3 shows a satellite image of Bailu. Figures 3.3.4 – 3.3.5 show respectively the maximum gust recorded at various stations in Hong Kong and the cloud-to-ground lightning distribution during the passage of Bailu. Figure 3.3.6 shows the lightning strokes captured in Yuen Long. Figure 3.3.7 shows radar imageries of Bailu.

表 3.3.1 在白鹿影響下，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 3.3.1 Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations when the tropical cyclone warning signals for Bailu 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)	西北偏北	NNW	43	25/8	00:51	西北偏西	WNW	22	25/8	12:00
中環碼頭	Central Pier	北	N	77	25/8	00:38	西	W	25	24/8	16:00
長洲	Cheung Chau	東北	NE	96	25/8	01:25	西	W	31	25/8	00:00
長洲泳灘	Cheung Chau Beach	北	N	104	25/8	01:22	北	N	40	25/8	02:00
青洲	Green Island	東北	NE	96	25/8	00:40	西北偏北	NNW	34	25/8	01:00
香港國際機場	Hong Kong International Airport	東北	NE	75	25/8	01:30	西南偏西	WSW	36	25/8	14:00
啟德	Kai Tak	北	N	65	25/8	00:37	西	W	20	24/8	16:00
京士柏	King's Park	西北偏北	NNW	79	25/8	00:37	西	W	16	25/8	01:00
南丫島	Lamma Island	北	N	58	25/8	01:10	西南偏西	WSW	36	25/8	12:00
流浮山	Lau Fau Shan	西北偏西	WNW	68	25/8	11:14	西南	SW	31	25/8	14:00
北角	North Point	北	N	62	25/8	00:38	西	W	27	25/8	13:00
坪洲	Peng Chau	東北	NE	68	25/8	01:15	東北偏東	ENE	27	25/8	02:00
平洲	Ping Chau	東北	NE	51	25/8	00:17	西南偏西	WSW	22	25/8	15:00
西貢	Sai Kung	西北	NW	58	25/8	00:29	西北	NW	23	25/8	01:00
沙洲	Sha Chau	東北偏東	ENE	77	25/8	01:27	西南偏南	SSW	31	25/8	18:00
沙螺灣	Sha Lo Wan	東	E	54	25/8	01:39	西南	SW	22	25/8	14:00
沙田	Sha Tin	東北偏北	NNE	62	25/8	00:23	西南偏南	SSW	20	25/8	15:00
		北	N	62	25/8	00:24					
石崗	Shek Kong	東	E	49	25/8	00:54	東	E	12	25/8	01:00
九龍天星碼頭	Star Ferry (Kowloon)	西北偏西	WNW	56	25/8	11:58	西	W	25	25/8	12:00
打鼓嶺	Ta Kwu Ling	東北偏北	NNE	59	25/8	00:53	東北	NE	14	25/8	01:00
大美督	Tai Mei Tuk	西北	NW	76	25/8	00:17	東北	NE	34	25/8	01:00
大帽山	Tai Mo Shan	東北偏北	NNE	113	25/8	01:07	西南偏西	WSW	77	25/8	16:00
大埔滘	Tai Po Kau	東北	NE	85	25/8	00:22	西北偏西	WNW	14	25/8	01:00
塔門東	Tap Mun East	西北	NW	52	25/8	00:20	西	W	27	25/8	15:00
將軍澳	Tseung Kwan O	西北偏北	NNW	41	25/8	00:30	西北偏北	NNW	9	25/8	01:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	西北偏北	NNW	51	25/8	01:26	西北偏西	WNW	20	25/8	12:00
屯門政府合署	Tuen Mun Government Offices	東北偏北	NNE	63	25/8	01:16	西南偏西	WSW	16	25/8	15:00
橫瀾島	Waglan Island	西北偏西	WNW	72	25/8	11:54	西	W	47	25/8	14:00
濕地公園	Wetland Park	東北偏東	ENE	47	25/8	01:02	東北偏東	ENE	13	25/8	02:00
黃竹坑	Wong Chuk Hang	西南偏西	WSW	38	25/8	00:38	西	W	16	25/8	01:00

大老山、昂坪- 沒有資料 Tate's Cairn, Ngong Ping - data not available

表 3.3.2 白鹿影響香港期間，香港天文台總部及其他各站所錄得的日雨量

Table 3.3.2 Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Bailu

站 (參閱圖 3.3.2) Station (See Fig. 3.3.2)			八月二十四日 24 Aug	八月二十五日 25 Aug	八月二十六日 26 Aug	總雨量(毫米) Total rainfall (mm)
香港天文台 Hong Kong Observatory (HKO)			0.0	88.4	178.3	266.7
香港國際機場 Hong Kong International Airport (HKA)			0.0	41.5	89.9	131.4
H23	香港仔	Aberdeen	0.0	100.5	160.5	261.0
N05	粉嶺	Fanling	0.0	49.5	76.0	125.5
N13	糧船灣	High Island	0.0	61.5	159.0	220.5
K04	佐敦谷	Jordan Valley	0.0	113.0	161.5	274.5
N06	葵涌	Kwai Chung	0.0	104.0	159.5	263.5
H12	半山區	Mid Levels	0.0	117.5	190.5	308.0
N09	沙田	Sha Tin	0.0	78.5	150.5	229.0
H19	筲箕灣	Shau Kei Wan	0.0	87.5	125.5	213.0
SEK	石崗	Shek Kong	0.0	68.5	61.0	129.5
K06	蘇屋邨	So Uk Estate	0.0	95.0	148.5	243.5
R31	大美督	Tai Mei Tuk	0.0	[61.5]	111.0	[172.5]
R21	踏石角	Tap Shek Kok	0.0	66.0	57.0	123.0
N17	東涌	Tung Chung	0.0	69.0	120.5	189.5
TMR	屯門水庫	Tuen Mun Reservoir	0.0	112.2	54.2	166.4

長洲 - 沒有資料 Cheung Chau - data not available

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

表 3.3.3 白鹿掠過期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

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

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	2.11	25/8	03:49	0.14	25/8	03:39
石壁	Shek Pik	2.10	25/8	03:55	0.12	25/8	09:36
大廟灣	Tai Miu Wan	2.04	25/8	04:19	0.20	25/8	10:04
大埔滘	Tai Po Kau	2.06	25/8	03:59	0.20	25/8	10:41
尖鼻咀	Tsim Bei Tsui	2.27	25/8	04:49	0.22	25/8	10:05

橫瀾島 - 沒有資料 Waglan Island - data not available

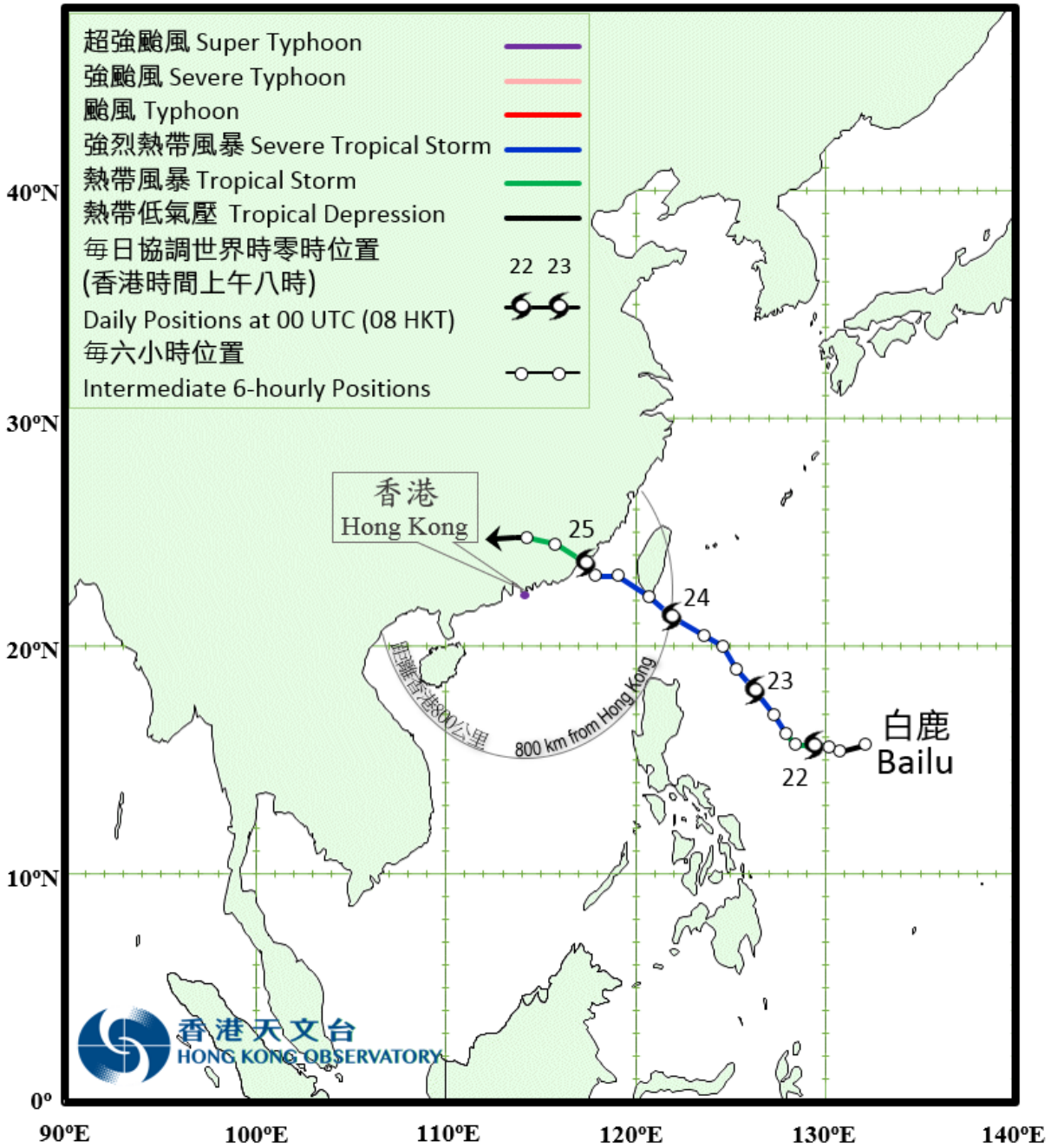


圖 3.3.1 二零一九年八月二十一日至二十六日白鹿的路徑圖。

Figure 3.3.1 Track of Bailu on 21 - 26 August 2019.

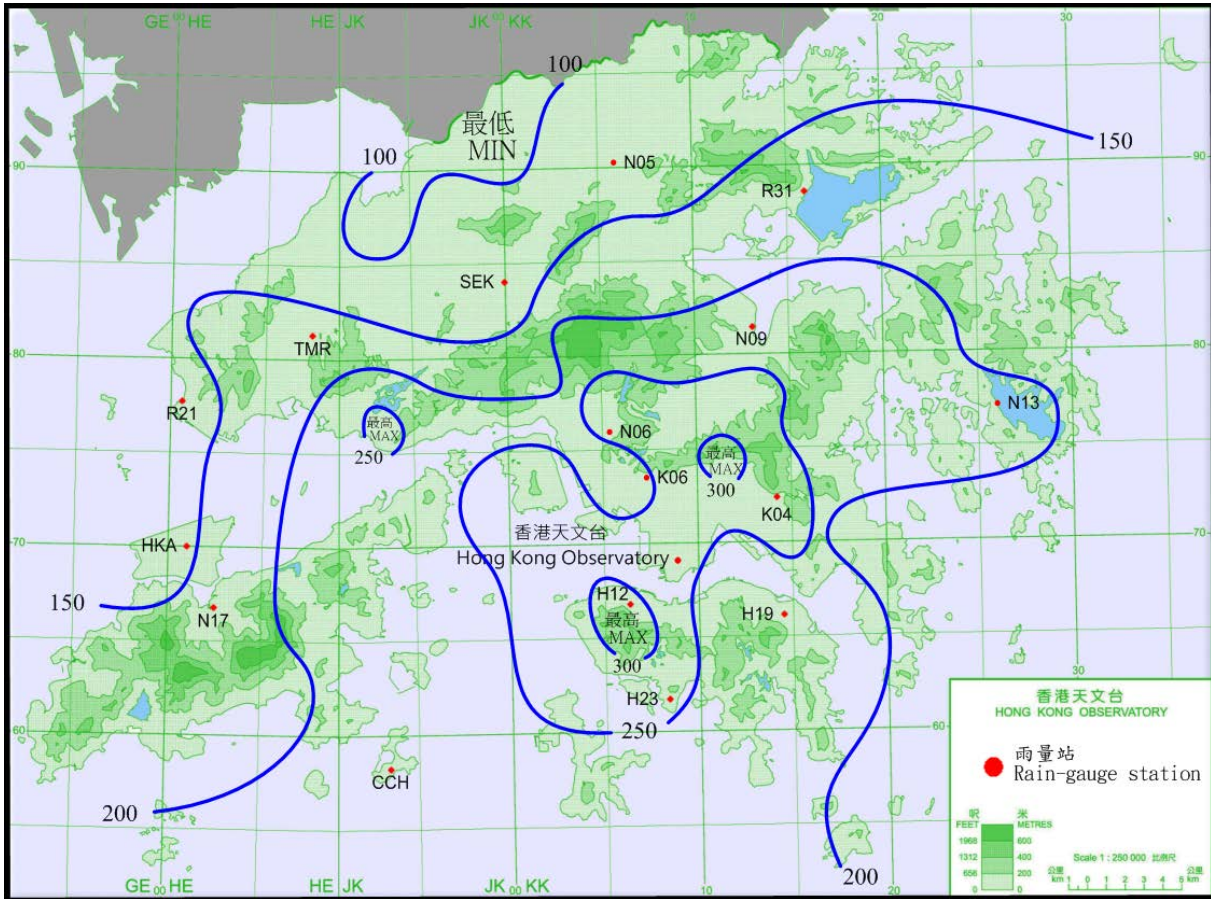


圖 3.3.2 二零一九年八月二十四日至二十六日的雨量分佈(等雨量線單位為毫米)。

Figure 3.3.2 Rainfall distribution on 24 - 26 August 2019 (isohyets in millimetres).

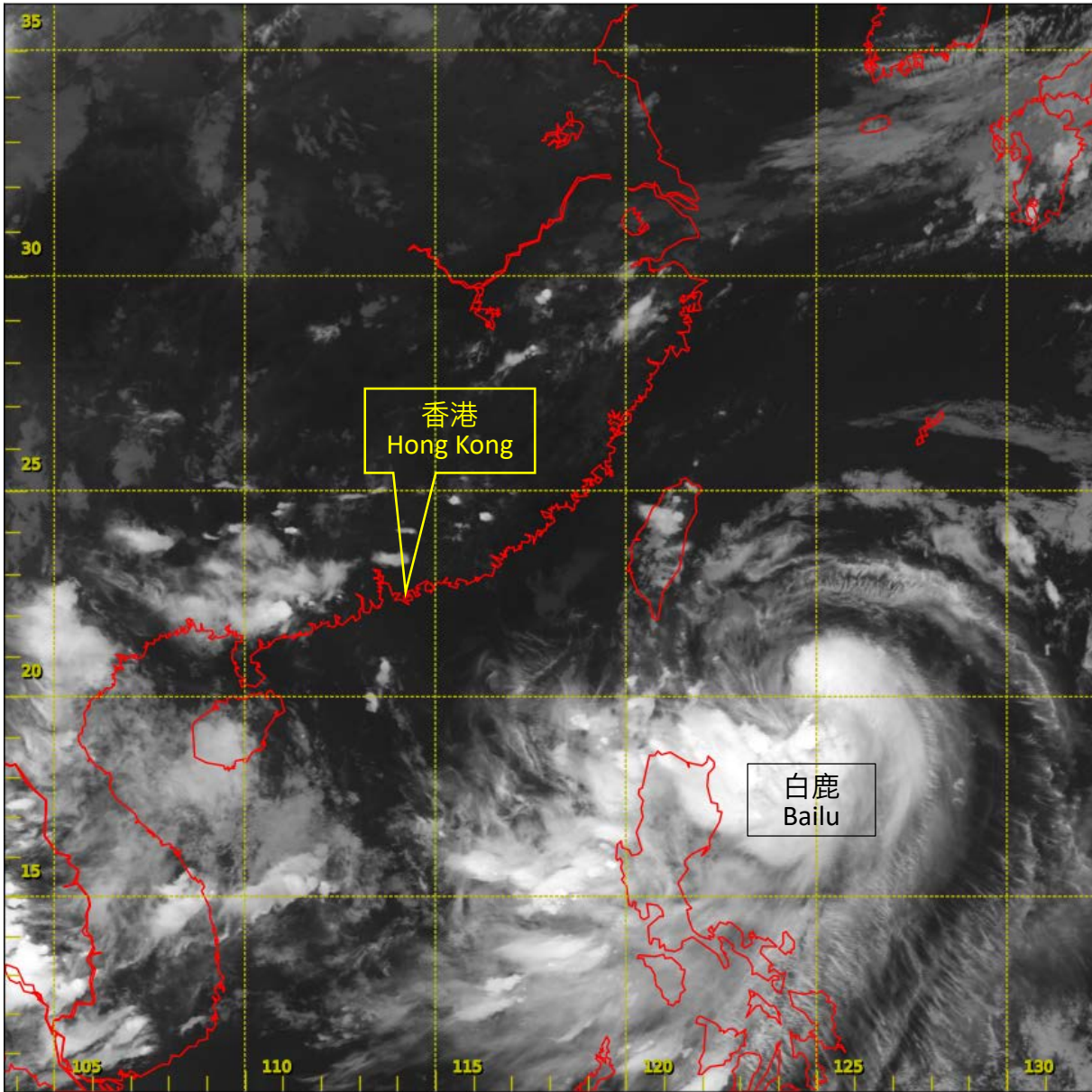


圖 3.3.3a 二零一九年八月二十三日下午 8 時左右的紅外線衛星圖片，當時白鹿達到其最高強度，中心附近最高持續風速估計為每小時 105 公里。

Figure 3.3.3a Infra-red satellite imagery at around 8 p.m. on 23 August 2019, when Bailu 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 Himawari-8 Satellite (H-8) of Japan Meteorological Agency (JMA).]

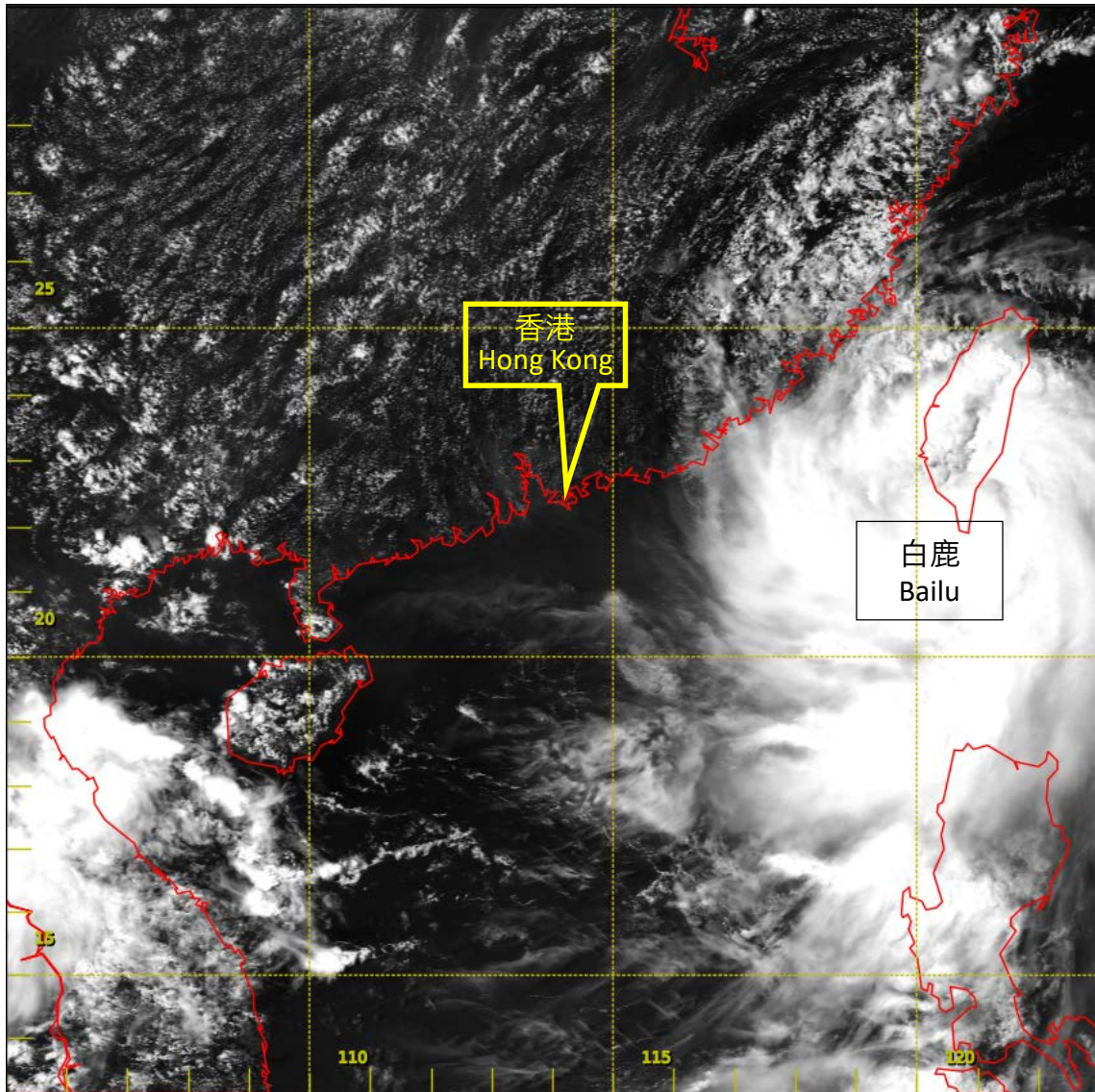


圖 3.3.3b 二零一九年八月二十四日下午 2 時左右的可見光衛星圖片。受白鹿的外圍下沉氣流影響，廣東沿岸普遍晴朗。

Figure 3.3.3b Visible satellite imagery at around 2 p.m. on 24 August 2019. Affected by the outer subsiding air of Bailu, it was generally fine over the coast of Guangdong.

[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).]

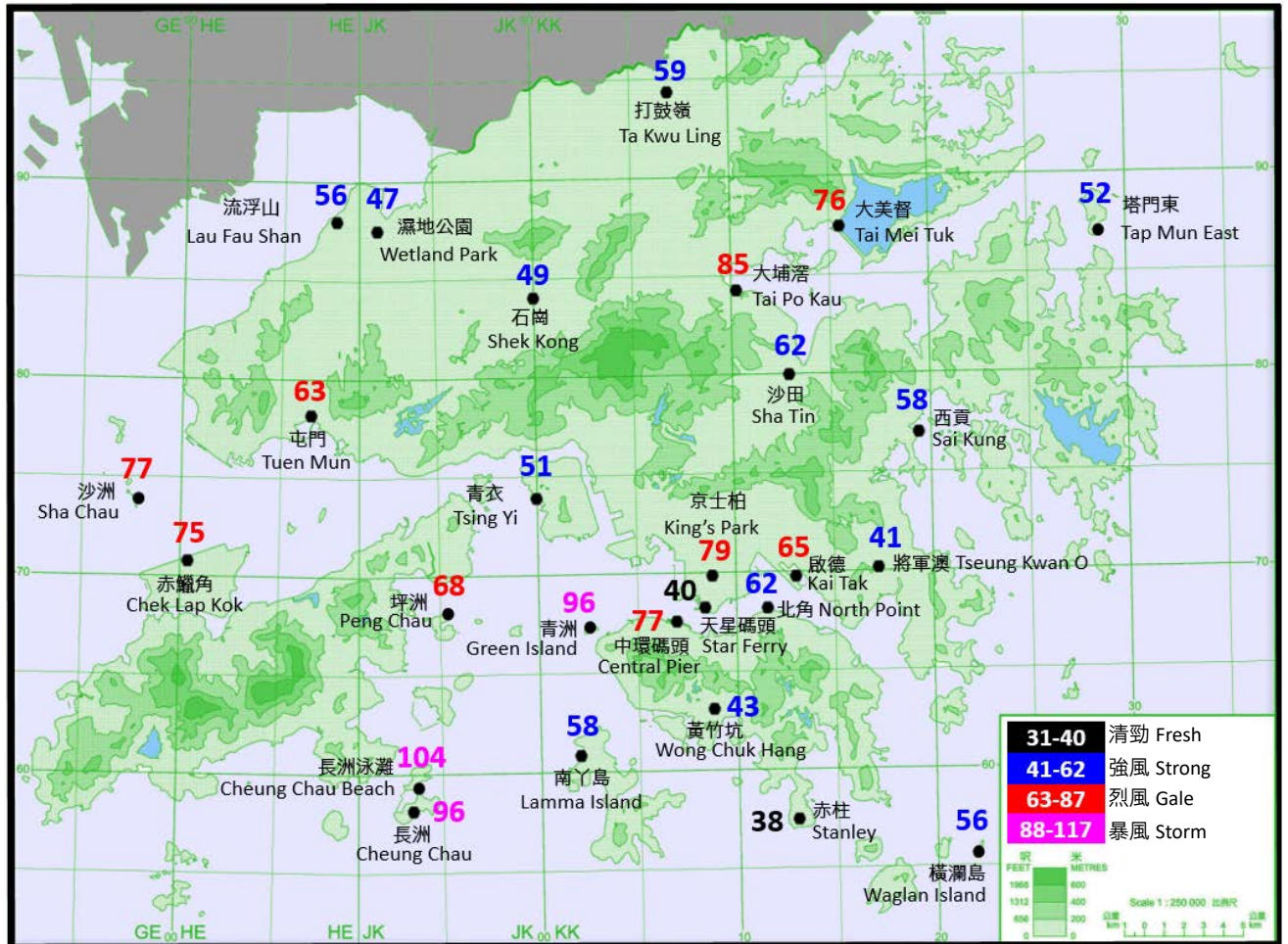


圖 3.3.4 二零一九年八月二十五日午夜至上午 2 時期間香港各站錄得的最高陣風 (公里/小時)，當時與白鹿相關的強雷雨帶正為本港帶來頻密的雷暴及狂風。

Figure 3.3.4 Maximum gust recorded (in km/h) at various stations in Hong Kong during the period between midnight and 2 a.m. on 25 August 2019. Bands of intense thundery showers associated with Bailu brought frequent thunderstorms and squalls to Hong Kong at that time.

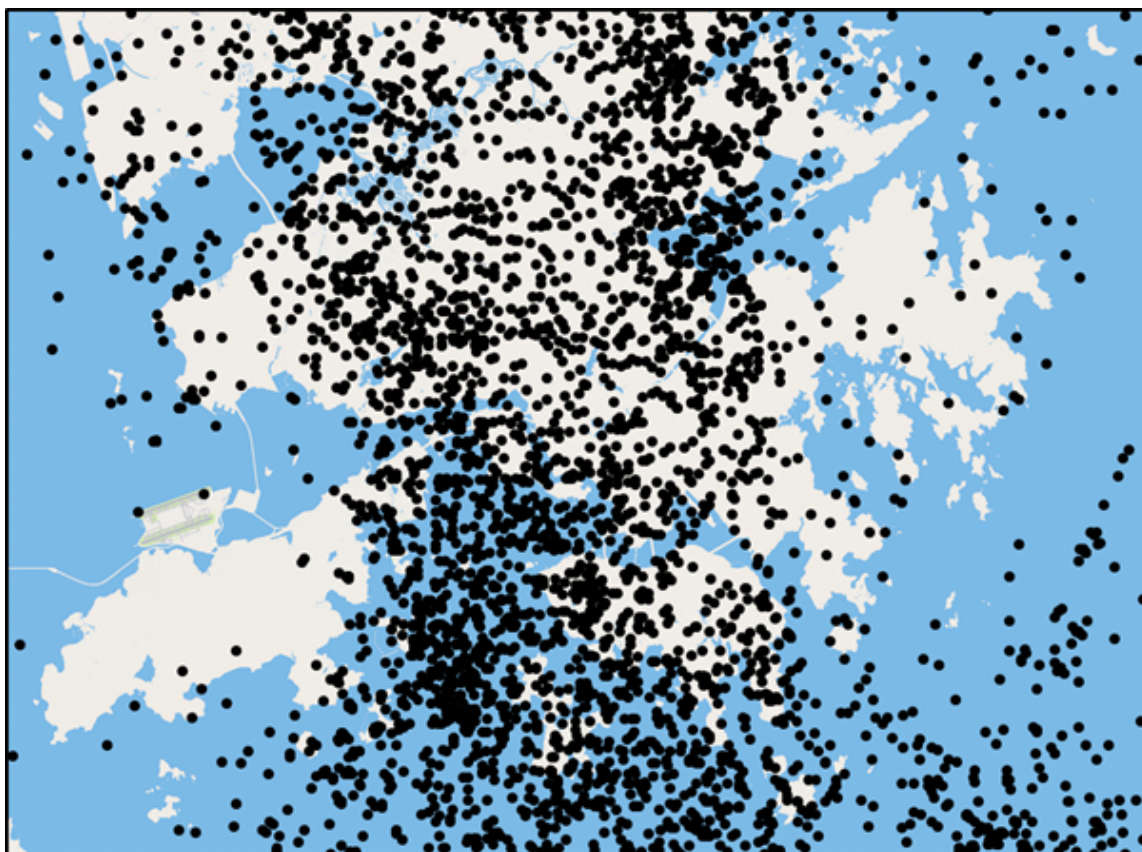


圖 3.3.5 二零一九年八月二十五日午夜至上午 2 時期間錄得的雲對地閃電。在這兩小時內香港境內共錄得接近 4000 次雲對地閃電。

Figure 3.3.5 The cloud-to-ground lightning recorded between midnight and 2:00 a.m. on 25 August 2019. Nearly 4 000 cloud-to-ground lightning strokes were recorded in Hong Kong during these two hours.



圖 3.3.6 二零一九年八月二十五日上午 1 時 30 分左右在元朗拍攝的閃電 (圖片鳴謝: Kenneth Wong) 。

Figure 3.3.6 Lightning strokes captured in Yuen Long at around 1:30 a.m. on 25 August 2019 (photo courtesy of Kenneth Wong).

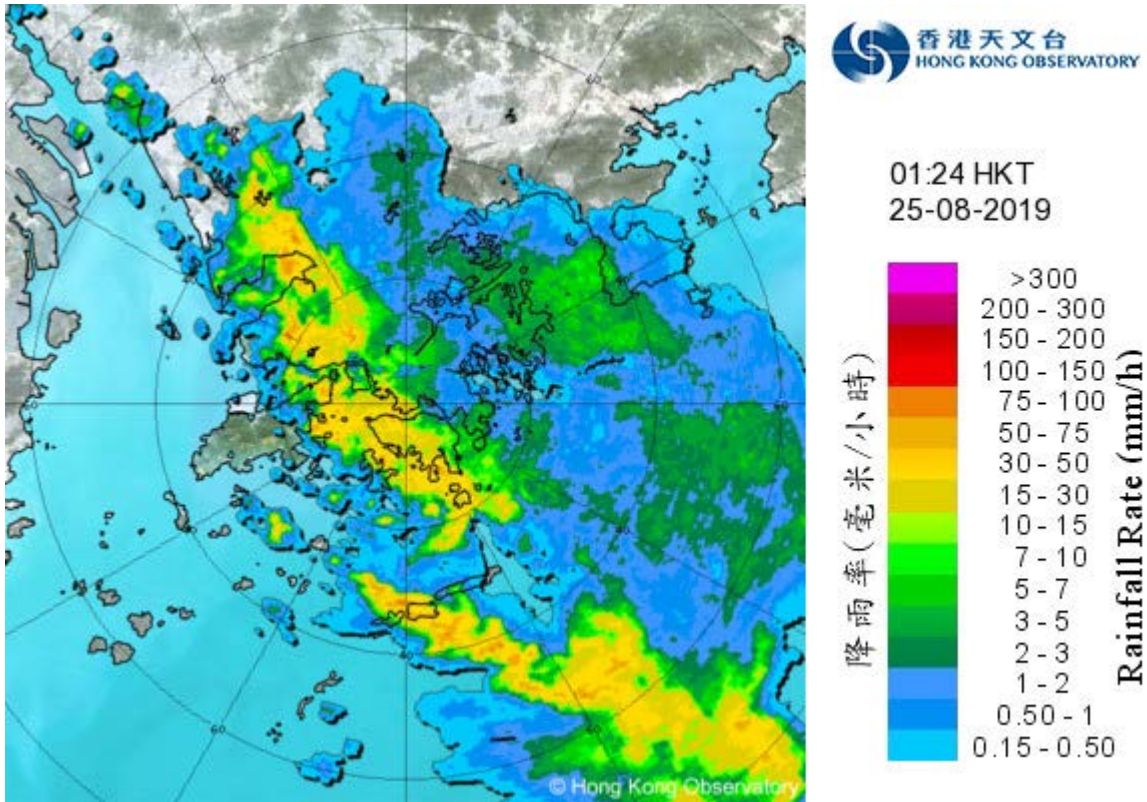


圖 3.3.7a 二零一九年八月二十五日上午 1 時 24 分的雷達回波圖像。當時與白鹿相關的強雷雨帶正影響本港，黃色暴雨警告正在生效。

Figure 3.3.7a Image of radar echoes at 1:24 a.m. on 25 August 2019. The bands of intense thundery showers associated with Bailu were affecting Hong Kong at the time and the Amber Rainstorm Warning was in force.

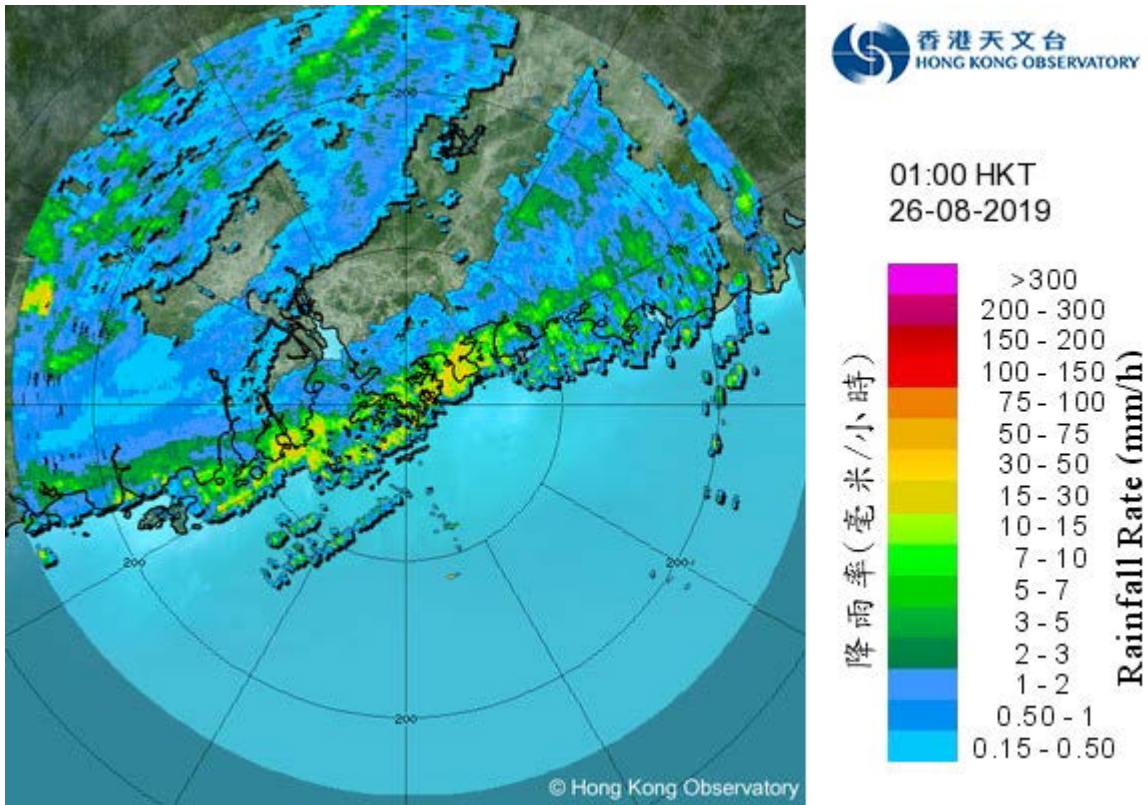


圖 3.3.7b 二零一九年八月二十六日上午 1 時正的雷達回波圖像。當時一道與白鹿相關的強雨帶正影響廣東沿岸，紅色暴雨警告正在生效。

Figure 3.3.7b Image of radar echoes at 1:00 a.m. on 26 August 2019. An intense rainband associated with Bailu was affecting the coast of Guangdong and the Red Rainstorm Warning was in force in Hong Kong at that time.