3.7 超強颱風雷伊(2122)：二零二一年十二月十二日至二十一日

雷伊是二零二一年第八個影響香港的熱帶氣旋。香港入冬後一般甚少受熱帶氣旋直接威脅，然而雷伊在十二月二十日逐漸靠近廣東沿岸，天文台需要發出一號戒備信號。這是自一九四六年以來年內最遲發出的熱帶氣旋警告信號，打破了艾瑪於一九七四年十二月初創下的紀錄。

熱帶低氣壓雷伊於十二月十二日晚上在馬尼拉之東南偏東約 2 680 公里的太平洋西部上形成，向西北偏西方向移動並逐漸增強。雷伊於十二月十五日開始迅速增強，翌日發展為超強颱風。雷伊橫過菲律賓後減弱為強颱風，十二月十七日向西移動，橫過南海南部。雷伊翌日再度增強為超強颱風，成為自一九六一年以來首個在十二月於南海出現的超強颱風。十二月十九日凌晨雷伊達到其最高強度，中心附近最高持續風速估計為每小時 205 公里。隨後兩日雷伊逐漸轉向東北方向移動，靠近廣東沿岸並迅速減弱，最後於十二月二十一日正午過後在香港以南海域減弱為一個低壓區。

天文台在十二月二十日上午 11 時 20 分發出一號戒備信號，當時雷伊集結在香港之西南偏南約 630 公里。在雷伊及東北季候風的共同影響下，當日本港吹清勁東北風，離岸及高地間中吹強風。翌日雷伊加速向東北靠近廣東沿岸並迅速減弱。雷伊在十二月二十一日上午十一時左右最接近本港，其中心位於在本港之東南偏南約 140 公里。隨著雷伊正午過後在香港以南海域減弱為一個低壓區，天文台在當日下午 12 時 20 分取消所有熱帶氣旋警告信號。

在雷伊的影響下，尖鼻咀錄得最高潮位 2.93 米(海圖基準面以上)，而大廟灣則錄得最大風暴潮(天文潮高度以上) 0.28 米。天文台總部於十二月二十一日上午 5 時 31 分錄得最低瞬時海平面氣壓 1011.9 百帕斯卡。

受東北季候風及與雷伊相關的雲雨帶影響，十二月二十日至二十一日本港天氣清涼及有雨。這兩天大嶼山及新界西北部錄得超過 25 毫米雨量。

雷伊吹襲香港期間並沒有造成嚴重破壞。根據報章報導，雷伊吹襲菲律賓期間造成最少 409 人死亡，超過十萬人需要撤離。

3.7 Super Typhoon Rai (2122): 12 – 21 December 2021

Rai was the eighth tropical cyclone affecting Hong Kong in 2021. It is rare to have tropical cyclones directly threatening Hong Kong in winter. However, as Rai gradually edged closer to the coast of Guangdong, the Observatory issued the Standby Signal No. 1 on 20 December. This is the latest tropical cyclone warning signal in a year since 1946, breaking the record of Irma in early December 1974.

Rai formed as a tropical depression over the western North Pacific about 2 680 km east-southeast of Manila on the night of 12 December. It moved west-northwestwards and intensified gradually. Rai started to intensify rapidly on 15 December and developed into a super typhoon on the next day. After sweeping across the Philippines, Rai weakened into a severe typhoon and moved westwards across the southern part of the South China Sea on 17 December. Rai re-intensified into a super typhoon the next day and became the first super typhoon occurring over the South China Sea in December since 1961. It reached its peak intensity in the small hours on 19 December with an estimated maximum sustained wind of 205 km/h near its centre. Turning to move northeastwards gradually on the following two days, Rai edged closer to the coast of Guangdong and weakened rapidly. It finally degenerated into an area of low pressure over the seas south of Hong Kong shortly after noon on 21 December.

The Standby Signal No. 1 was issued at 11:20 am on 20 December when Rai was about 630 km south-southwest of Hong Kong. Under the combined effect of Rai and the northeast monsoon, local winds were fresh northeasterlies, occasionally reaching strong force offshore and on high ground on that day. Rai picked up speed to move northeastwards towards the coast of Guangdong and weakened rapidly the next day. It came closest to the territory around 11:00 a.m. on 21 December with its centre about 140 km south-southeast of Hong Kong. As Rai degenerated into an area of low pressure over the seas south of Hong Kong shortly after noon, all tropical cyclone warning signals were cancelled at 12:20 p.m. on that day.

Under the influence of Rai, a maximum sea level (above chart datum) of 2.93 m was recorded at Tsim Bei Tsui. A maximum storm surge of 0.28 m (above astronomical tide) was recorded at Tai Miu Wan. At the Observatory Headquarters, the lowest instantaneous mean sea-level pressure of 1011.9 hPa was recorded at 5:31 a.m. on 21 December.

Affected by the northeast monsoon and the rain-bearing cloud band associated with Rai, it was rainy and cool in Hong Kong on 20 – 21 December. More than 25 millimeters of rainfall were recorded over Lantau Island and the northwestern part of the New Territories on these two days.

Rai did not cause significant damage in Hong Kong. According to press reports, Rai left at least 409 deaths and over 100 000 people were evacuated in the Philippines during its passage.

表 3.7.1　在雷伊影響下，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 3.7.1　Maximum gust peak speeds and maximum hourly mean winds with associated wind directions recorded at various stations when the tropical cyclone warning signals for Rai 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
中環碼頭	Central Pier	東	E	34	20/12	17:05	東南偏東	ESE	18	20/12	15:00
長洲	Cheung Chau	西北偏北	NNW	65	21/12	12:16	北	N	38	21/12	12:00
長洲泳灘	Cheung Chau Beach	東北	NE	60	21/12	11:47	東北偏北	NNE	33	21/12	02:00
青洲	Green Island	東北	NE	57	21/12	01:28	東北偏東	ENE	40	21/12	02:00
香港國際機場	Hong Kong International Airport	東北	NE	33	20/12	13:17	東北	NE	21	21/12	01:00
啟德	Kai Tak	東北偏東	ENE	39	20/12	14:31	西北偏西	WNW	14	21/12	11:00
京士柏	King's Park	東	E	41	20/12	20:44	東	E	17	20/12	22:00
南丫島	Lamma Island	西北	NW	48	21/12	12:16	西北	NW	34	21/12	12:00
流浮山	Lau Fau Shan	東北偏北	NNE	30	20/12	22:05	東	E	19	20/12	12:00
昂坪	Ngong Ping	東北偏東	ENE	60	20/12	19:40	東北偏東	ENE	46	20/12	20:00
		東北偏東	ENE	60	20/12	19:41					
北角	North Point	東	E	41	21/12	01:04	東	E	24	21/12	01:00
坪洲	Peng Chau	西北偏北	NNW	52	21/12	11:53	西北偏北	NNW	35	21/12	12:00
平洲	Ping Chau	東北	NE	30	20/12	22:18	西北	NW	8	21/12	06:00
							西北	NW	8	21/12	07:00
西貢	Sai Kung	東北偏北	NNE	48	21/12	11:23	北	N	22	21/12	12:00
沙洲	Sha Chau	北	N	45	21/12	02:35	北	N	35	20/12	20:00
沙螺灣	Sha Lo Wan	東北偏東	ENE	23	20/12	20:31	東北偏東	ENE	10	21/12	00:00
							東北	NE	10	21/12	01:00
沙田	Sha Tin	東北	NE	27	20/12	14:16	北	N	12	20/12	21:00
							北	N	12	21/12	03:00
九龍天星碼頭	Star Ferry (Kowloon)	東南偏東	ESE	30	20/12	14:36	東	E	17	20/12	12:00
打鼓嶺	Ta Kwu Ling	北	N	33	21/12	09:59	北	N	14	21/12	11:00
大美督	Tai Mei Tuk	東北偏北	NNE	53	21/12	01:31	東北偏北	NNE	31	21/12	03:00
		東北偏北	NNE	53	21/12	02:42					
大帽山	Tai Mo Shan	東南偏東	ESE	79	21/12	02:23	東	E	60	20/12	20:00
大埔滘	Tai Po Kau	西	W	30	21/12	10:11	西	W	19	21/12	11:00
塔門東	Tap Mun East	北	N	41	21/12	11:33	北	N	19	21/12	11:00
大老山	Tate's Cairn	東北	NE	66	21/12	01:14	東	E	48	20/12	21:00
將軍澳	Tseung Kwan O	東北偏北	NNE	34	21/12	02:32	東北偏東	ENE	12	21/12	10:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	西北	NW	23	21/12	07:20	西北	NW	9	21/12	05:00
		西北	NW	23	21/12	07:21					
屯門政府合署	Tuen Mun Government Offices	東北偏北	NNE	35	20/12	13:03	東北偏北	NNE	17	20/12	14:00
橫瀾島	Waglan Island	東北	NE	68	21/12	00:41	東北偏東	ENE	57	21/12	01:00
濕地公園	Wetland Park	東北偏東	ENE	23	20/12	11:35	東北偏東	ENE	10	20/12	12:00
黃竹坑	Wong Chuk Hang	北	N	53	20/12	22:19	東北偏東	ENE	21	21/12	02:00

黃麻角(赤柱)、石崗 - 沒有資料　　Bluff Head (Stanley), Shek Kong - data not available

表 3.7.2　雷伊影響香港期間，香港天文台總部及其他各站所錄得的日雨量

Table 37.2　Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Rai

站(參閱圖 3.7.2) Station (See Fig. 3.7.2)			十二月二十日 20 Dec	十二月二十一日 21 Dec	總雨量(毫米) Total rainfall (mm)
香港天文台 Hong Kong Observatory (HKO)			9.4	2.4	11.8
香港國際機場 Hong Kong International Airport (HKA)			15.5	12.8	28.3
長洲 Cheung Chau (CCH)			8.0	6.5	14.5
H23	香港仔	Aberdeen	5.5	1.0	6.5
N05	粉嶺	Fanling	12.5	9.0	21.5
N13	糧船灣	High Island	11.0	5.0	16.0
K04	佐敦谷	Jordan Valley	11.0	4.5	15.5
N06	葵涌	Kwai Chung	8.5	1.5	10.0
H12	半山區	Mid Levels	11.5	3.5	15.0
N09	沙田	Sha Tin	11.0	7.0	18.0
H19	筲箕灣	Shau Kei Wan	10.0	4.5	14.5
SEK	石崗	Shek Kong	12.5	6.5	19.0
K06	蘇屋邨	So Uk Estate	11.0	1.5	12.5
R31	大美督	Tai Mei Tuk	8.5	4.5	13.0
R21	踏石角	Tap Shek Kok	12.0	16.0	28.0
N17	東涌	Tung Chung	14.5	17.5	32.0
TMR	屯門水庫	Tuen Mun Reservoir	13.7	16.9	30.6

表 3.7.3　雷伊影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

Table 3.7.3　Times and heights of the maximum sea level and the maximum storm surge recorded at tide stations in Hong Kong during the passage of Rai

站 (參閱圖 1.1) Station (See Fig. 1.1)		最高潮位(海圖基準面以上) M aximum 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	2.56	20/12	21:17	0.22	21/12	06:27
石壁	Shek Pik	2.68	20/12	21:00	0.25	21/12	03:37
大廟灣	Tai Miu Wan	2.53	20/12	21:05	0.28	21/12	06:08
大埔滘	Tai Po Kau	2.53	20/12	19:49	0.27	21/12	06:23
尖鼻咀	Tsim Bei Tsui	2.93	20/12	22:13	0.25	21/12	06:23

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

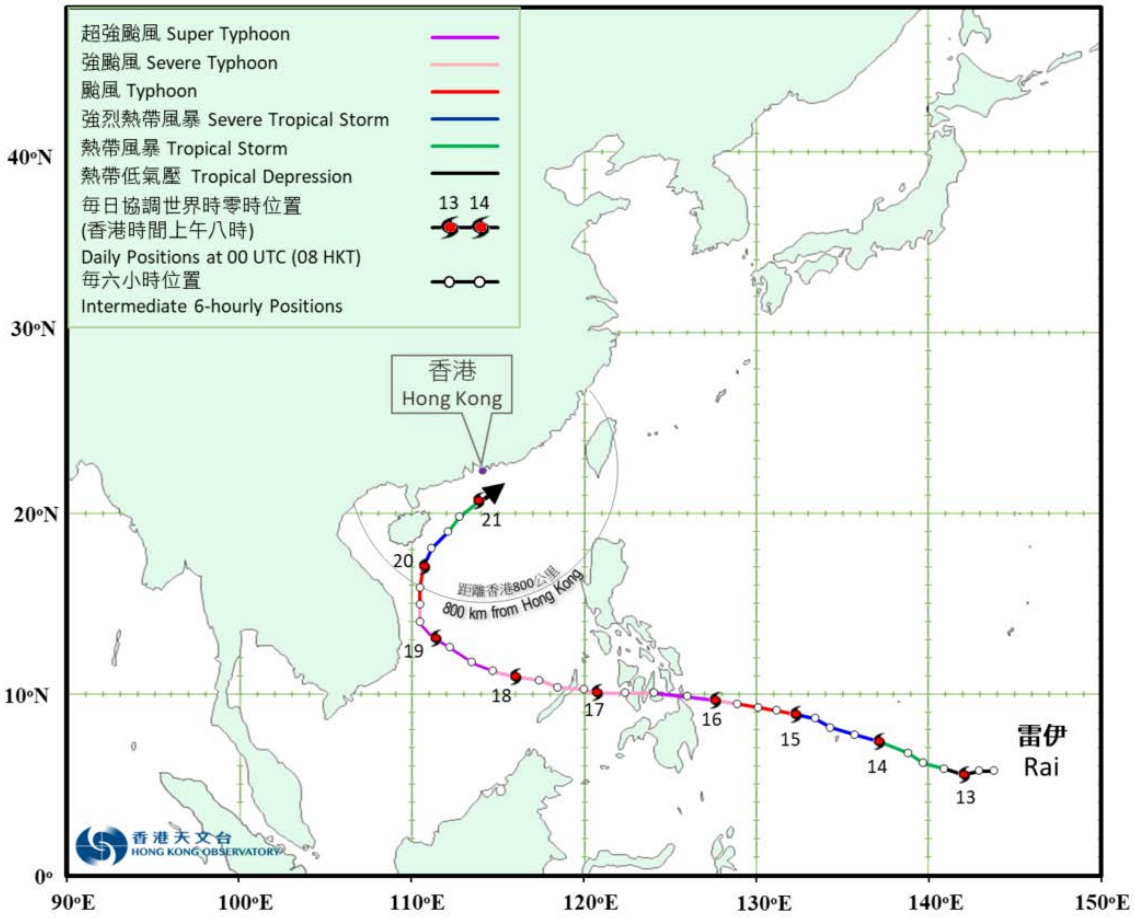

圖 3.7.1a　　二零二一年十二月十二日至二十一日雷伊(2122)的路徑圖。

Figure 3.7.1a　Track of Rai (2122): 12 - 21 December 2021.

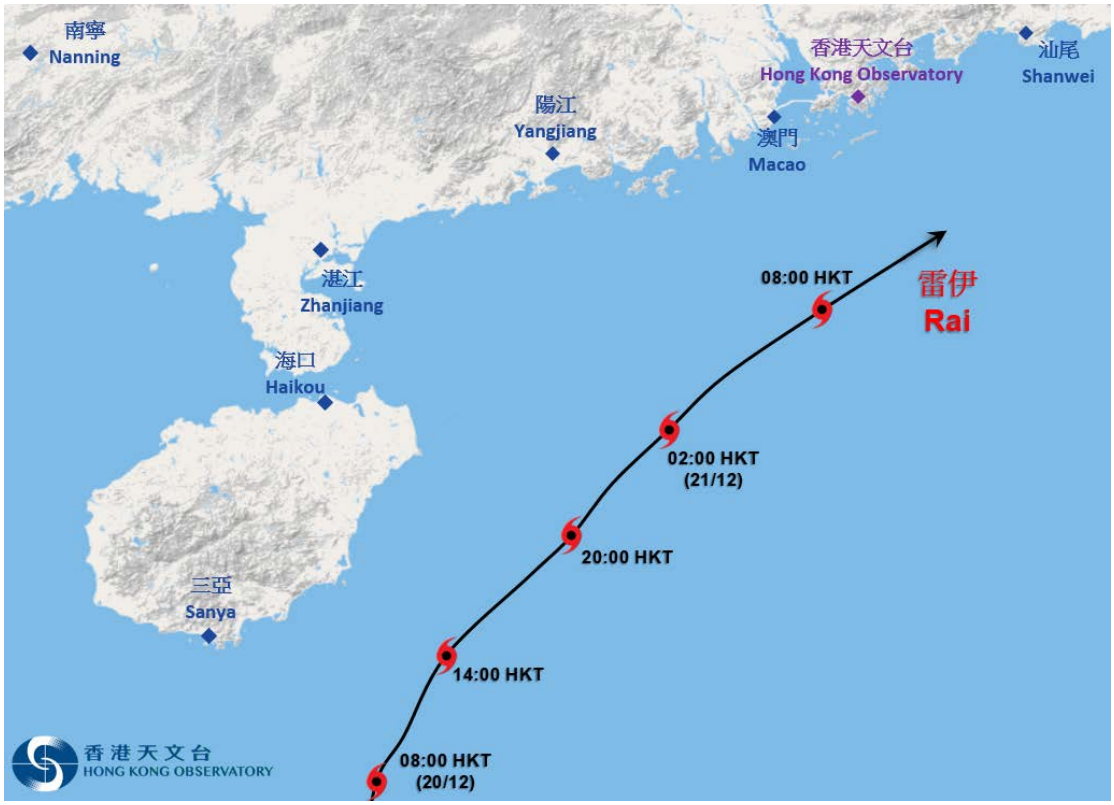

圖 3.7.1b　　雷伊接近香港時的路徑圖。

Figure 3.7.1b　Track of Rai near Hong Kong.

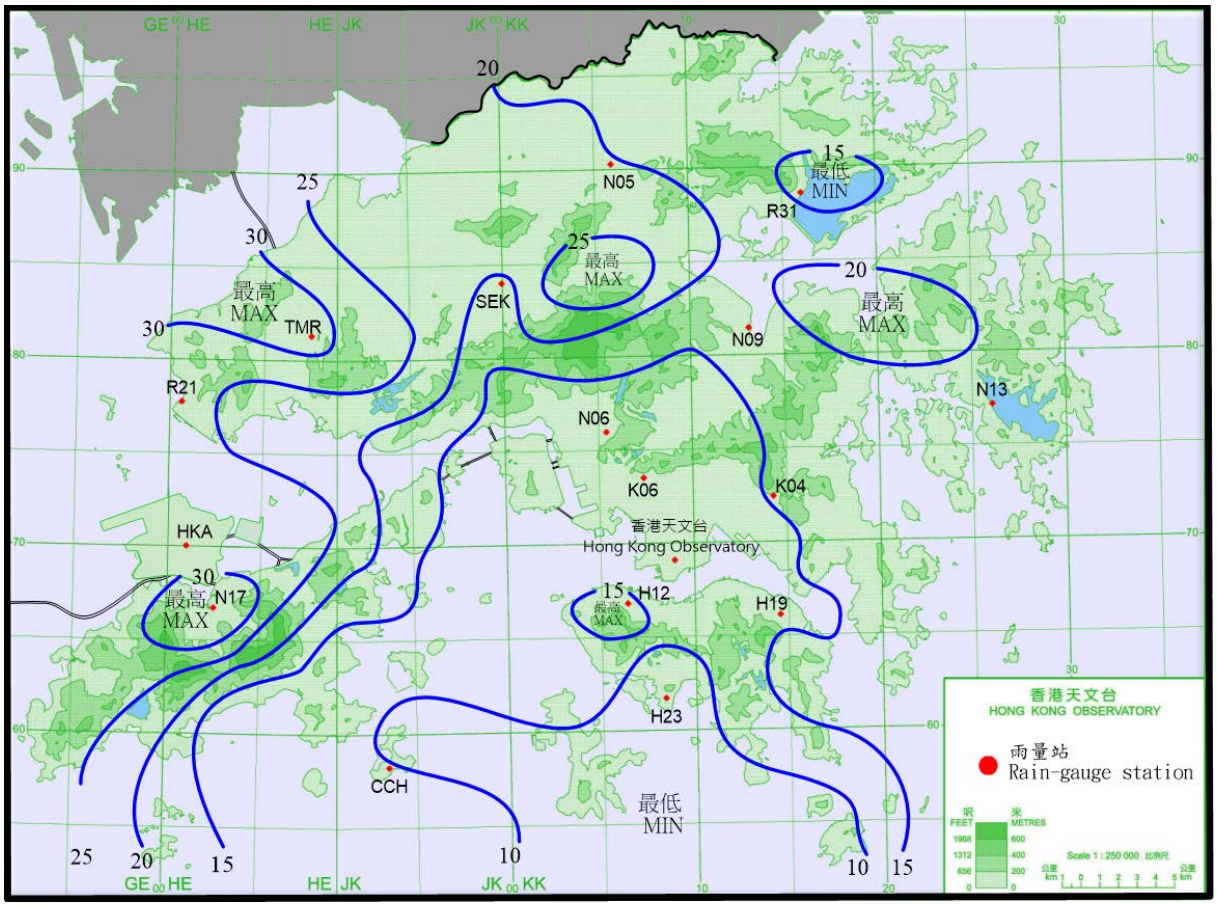

圖 3.7.2　　二零二一年十二月二十日至二十一日的雨量分佈 (等雨量線單位為毫米)。

Figure 3.7.2　Rainfall distribution on 20 – 21 December 2021 (isohyets are in millimetres).

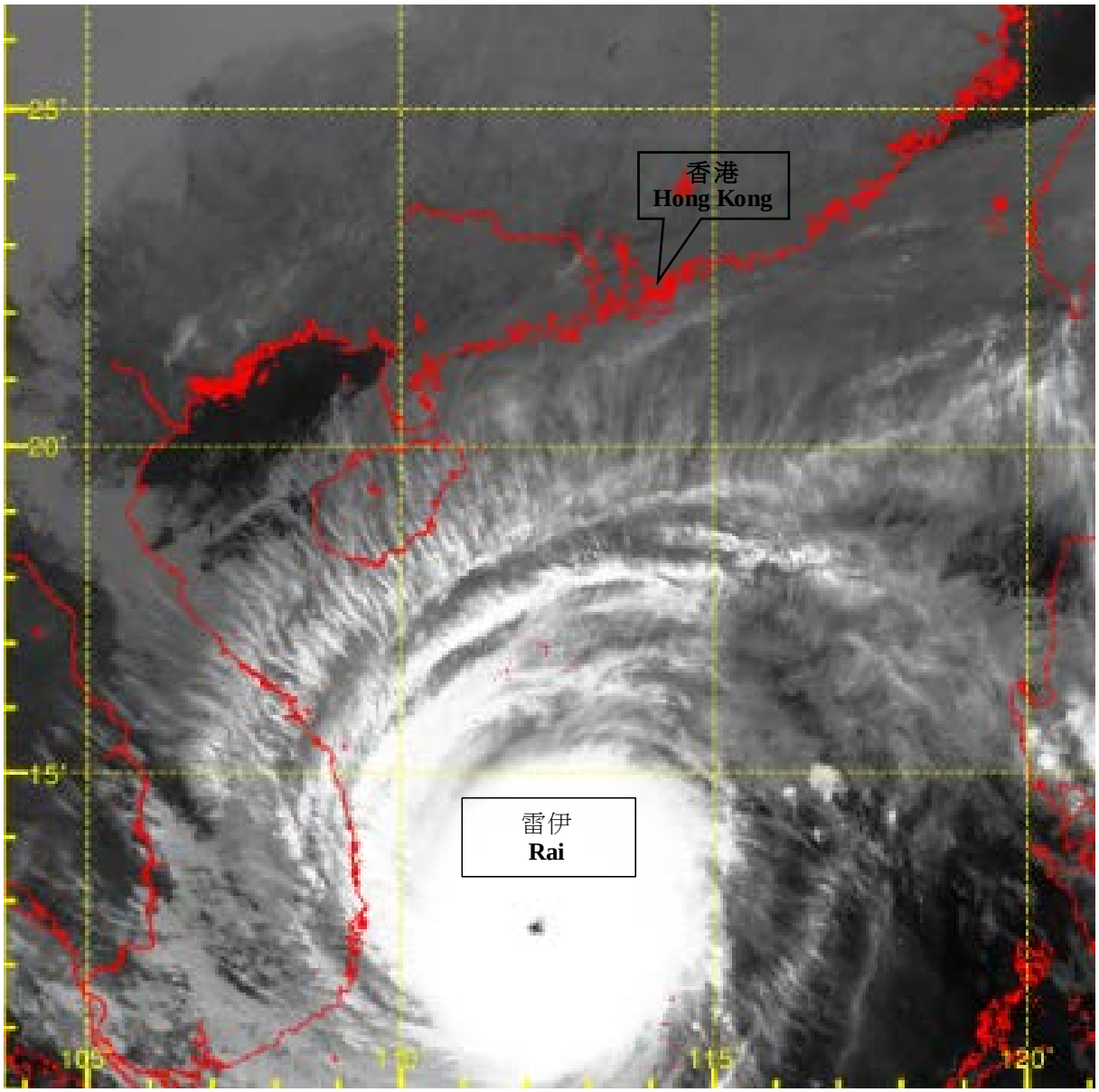

圖 3.7.3　二零二一年十二月十九日上午 2 時左右的紅外線衛星圖片，當時雷伊達到其最高強度，中心附近最高持續風速估計為每小時 205 公里。

Figure 3.7.3　Infra-red satellite imagery around 2 a.m. on 19 December 2021 when Rai was at its peak intensity with an estimated maximum sustained wind of 205 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.]

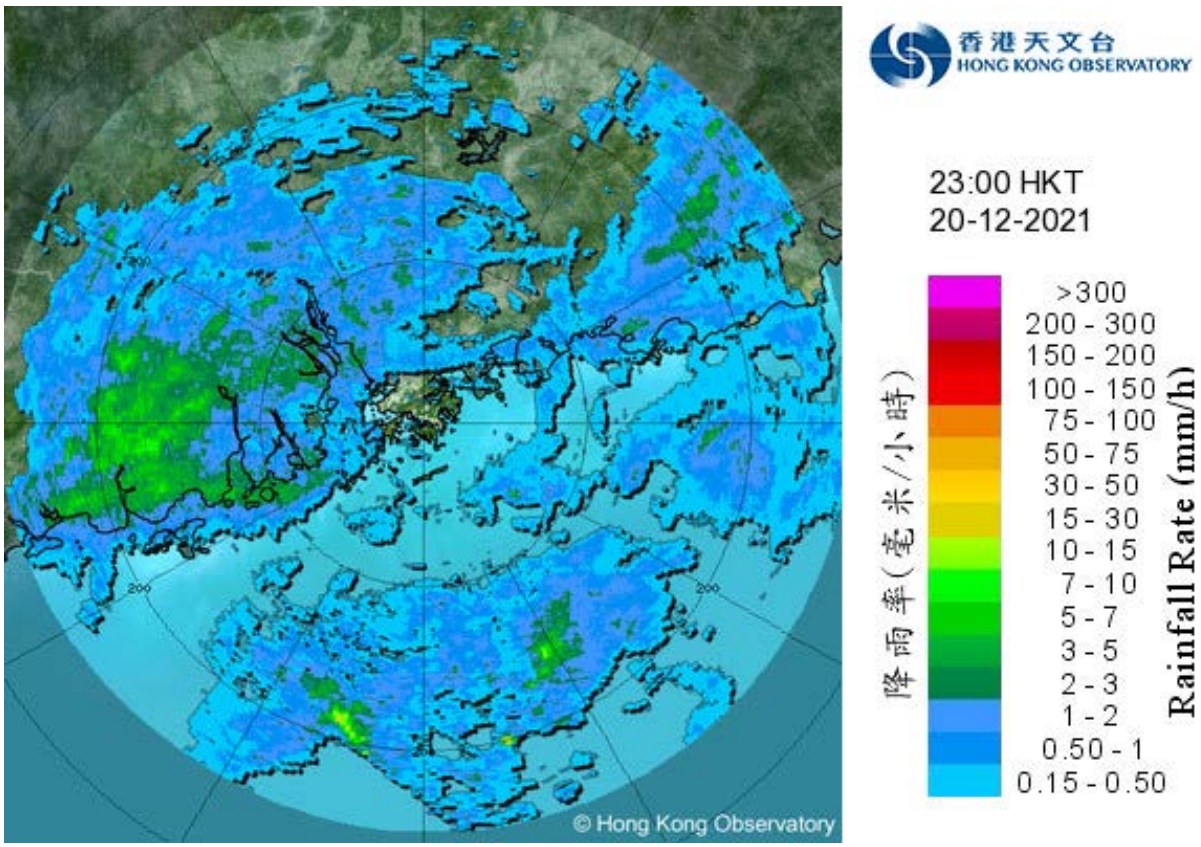

圖 3.7.4　二零二一年十二月二十日下午 11 時的雷達回波圖像，當時與雷伊相關的雨帶正影響廣東沿岸及南海北部。

Figure 3.7.4　Radar echoes captured at 11 p.m. on 20 December 2021 when the rainbands associated with Rai were affecting the coast of Guangdong and the northern part of the South China Sea.