3.3 颱風科羅旺（0312）： 二零零三年八月十七日至二十六日

科羅旺於八月十七日在關島西南偏南約110公里處發展爲一個熱帶低氣壓。最初兩天它向西北推進，八月十九日轉向西移。科羅旺於八月二十日晚增強爲一個熱帶風暴，八月二十一日晚進一步增強爲一個強烈熱帶風暴，八月二十二日更增強爲一個颱風，並於當晚橫過呂宋。在菲律賓，科羅旺帶來的大雨引致一名女孩死亡，上千家庭需要遷離。它在八月二十三日早上進入南海後向西北偏西推進，翌日橫過南海北部。科羅旺八月二十五日掠過海南島東北部後進入北部灣。科羅旺在廣東、廣西及海南島導致最少二人死亡及五人受傷，接近13 000間房屋倒塌和14萬公頃的農作物受損，直接經濟損失逾21億人民幣。科羅旺於七月二十六日清晨在越南北部登陸後減弱爲一個強烈熱帶風暴，同日進一步減弱爲一個熱帶風暴，並於當晚在內陸消散。在越南北部，科羅旺導致一人死亡及五人受傷，約1 000間房屋被毀。

在香港，天文台在八月二十三日早上9時30分發出一號戒備信號，當時科羅旺位於香港東南約760公里。八月二十四日早上科羅旺移近華南海岸，本地風力亦隨著科羅旺的移近而逐漸增強，天文台於上午11時30分發出三號強風信號。科羅旺的外圍雨帶爲本港帶來狂風大雨及雷暴，天文台在早上4時20分發出黃色暴雨警告信號，當日本港大部份地區均錄得超過70毫米的雨量。天文台於八月二十四日下午3時48分錄得的最低瞬時海平面氣壓爲1001.6百帕斯卡。科羅旺在八月二十四日晚上最接近香港，當時它位於香港西南偏南約340公里。

在三號強風信號發出期間，本地普遍吹東至東南強風，離岸海域及高地間中吹烈風。八月二十五日早上科羅旺移離香港並進入北部灣，本港風力逐漸減弱，所有熱帶氣旋警告於上午11時30分取消。受到科羅旺的外圍雨帶影響，本港當日間中有狂風大驟雨及雷暴，大部份地區錄得超過30毫米雨量，其中大嶼山及屯門的雨量更超過100毫米。

在科羅旺的吹襲下，本港共有11人受傷。另有68宗大樹被吹倒及多宗高處墮物的報告。在牛頭角上邨，一幅大面積的棚架受強風吹襲倒塌，一條來往離島的小輪航線及四條巴士線一度停止服務。

表3.3.1-3.3.3分別是科羅旺影響香港時各站錄得的最高風速、日雨量及最高潮汐資料。圖3.3.1和3.3.2分別是科羅旺的路徑圖及香港雨量分佈圖，圖3.3.3是科羅旺的衛星圖像。

3.3 Typhoon Krovanh (0312) : 17 - 26 August 2003

Krovanh developed as a tropical depression about 110 km south-southwest of Guam on 17 August. It tracked northwestwards in the first two days and turned westwards on 19 August. Krovanh intensified into a tropical storm on the night of 20 August and further intensified into a severe tropical storm the next night. It reached typhoon strength on 22 August and crossed Luzon that night. In the Philippines, the heavy rain brought by Krovanh killed a girl and caused over 1000 families to be displaced. Adopting a west-northwest track, Krovanh entered the South China Sea on 23 August morning and moved across the northern part of the South China Sea the next day. After skirting the northeastern part of Hainan, Krovanh entered Beibu Wan on 25 August. In Guangdong, Guangxi and Hainan, at least two people were killed and five were injured during the approach of Krovanh. About 13 000 houses collapsed and 140 thousands hectares of crops were affected. The estimated economic loss was over 2.1 billions RMB. Krovanh weakened into a severe tropical storm on the early morning on 26 August after making landfall over northern Vietnam. It further weakened into a tropical storm the same day and dissipated inland during the night. In northern Vietnam, one person was found dead and five were hurt during the passage of Krovanh. Krovanh also damaged about 1 000 houses.

In Hong Kong, the Standby Signal No. 1 was issued at 9.30 a.m. on 23 August when Krovanh was located about 760 km to the southeast of Hong Kong. As Krovanh moved towards the South China coast on the morning of 24 August, local winds began to strengthen. The Strong Wind Signal No. 3 was issued at 11.30 a.m. Its outer rainbands brought squally heavy rain and thunderstorms to Hong Kong. The Amber Rainstorm Warning Signal was issued at 4.20 a.m. and more than 70 millimetres of rainfall were recorded over most parts of the territory on that day. The lowest instantaneous mean sea-level pressure of 1001.6 hPa was recorded at the Hong Kong Observatory at 3.48 p.m. on 24 August. Krovanh was closest to Hong Kong on 24 August night when it was about 340 km to the south-southwest.

While the Strong Wind Signal No. 3 was in force, strong east to southeasterly winds were generally experienced in Hong Kong, with occasionally gales offshore and on high ground. As Krovanh moved away from Hong Kong and entered Beibu Wan on 25 August, local winds began to weaken gradually. All tropical cyclone warnings were cancelled at 11.30 a.m. the same day. Under the influence of outer rainbands of Krovanh, there were occasional heavy squally showers and thunderstorms in Hong Kong on 25 August. While over 30 millimetres of rainfall were recorded in most parts of the territory, rainfall in Lantau Island and Tuen Mun exceeded 100 millimetres.

The approach of Krovanh resulted in 11 people injured. There were 68 cases of uprooted trees and several cases of falling objects in Hong Kong. A large section of scaffolding in Ngau Tau Kok Upper Estate also collapsed under high winds. One ferry service to outlying island and four bus routes were suspended temporarily.

Information on maximum wind, daily rainfall and maximum sea level during the passage of Krovanh is given in Tables 3.3.1 – 3.3.3. Figures 3.3.1 and 3.3.2 show the track of Krovanh and the rainfall distribution in Hong Kong respectively. Figure 3.3.3 is the satellite imagery of Krovanh.

表 3.3.1 在科羅旺影響下，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 during the issuing of the tropical cyclone warning signals for Krovanh

站 (參閱圖1.1)	Station (see Fig. 1.1)	最高陣風 Maximum Gust		日期/月份 Date/Month	時間 Time	最高每小時平均風速 Maximum Hourly Wind		日期/月份 Date/Month	時間 Time
		風向 Direction	風速(公里/時) Speed (km/h)			風向 Direction	風速(公里/時) Speed (km/h)		
中環	Central	東 E	81	24/8	21:25	東 E	36	24/8	13:00
中環廣場	Central Plaza	- -	118	25/8	04:49	- -	76	24/8	13:00
香港國際機場	Hong Kong International Airport	東南 SE	88	25/8	04:55	東南偏東 ESE	52	25/8	05:00
長洲	Cheung Chau	東南偏東 ESE	144	24/8	22:22	東南偏東 ESE	87	24/8	24:00
長沙灣	Cheung Sha Wan	東北偏北 NNE	96	24/8	11:59	東北 NE	40	24/8	13:00
青洲	Green Island	東北偏東 ENE	104	24/8	12:32	東北偏東 ENE	67	24/8	13:00
啓德	Kai Tak	東南偏東 ESE	101	24/8	23:16	東南偏東 ESE	43	24/8	24:00
京士柏	King's Park	東北偏東 ENE	77	25/8	03:44	東 E	31	25/8	04:00
流浮山	Lau Fau Shan	東 E	81	24/8	13:53	東 E	40	24/8	14:00
北角	North Point	東北偏東 ENE	87	24/8	12:22	東北偏東 ENE	41	24/8	13:00
平洲	Ping Chau	東南偏東 ESE	76	25/8	09:08	東 E	23	24/8	14:00
西貢	Sai Kung	東南偏東 ESE	94	25/8	00:05	東北 NE	47	24/8	13:00
						東南 SE	47	25/8	09:00
沙螺灣	Sha Lo Wan	東北偏東 ENE	122	25/8	03:05	東 E	54	24/8	13:00
沙田	Sha Tin	東 E	77	24/8	12:21	東北偏東 ENE	23	24/8	13:00
石崗	Shek Kong	東 E	85	24/8	23:25	東 E	31	24/8	17:00
						東 E	31	24/8	23:00
九龍天星碼頭	Star Ferry, Kowloon	東 E	90	25/8	00:05	東 E	45	24/8	24:00
打鼓嶺	Ta Kwu Ling	- -	79	24/8	15:19	- -	30	24/8	24:00
大尾篤	Tai Mei Tuk	東北偏東 ENE	115	24/8	19:45	東北偏東 ENE	68	24/8	13:00
大帽山	Tai Mo Shan	東南偏東 ESE	130	25/8	03:53	東南 SE	79	25/8	07:00
大老山	Tate's Cairn	東北 NE	130	24/8	11:45	東北偏東 ENE	70	24/8	13:00
鯽魚湖	Tsak Yue Wu	東北偏東 ENE	68	24/8	18:44	東北偏東 ENE	19	24/8	12:00
將軍澳	Tseung Kwan O	東南偏東 ESE	72	25/8	05:36	東南偏東 ESE	23	25/8	09:00
青衣	Tsing Yi	東南 SE	118	25/8	09:57	東南偏東 ESE	58	25/8	01:00
屯門	Tuen Mun	東南 SE	96	25/8	00:07	東南 SE	30	25/8	02:00
橫瀾島	Waglan Island	東 E	122	24/8	14:30	東北偏東 ENE	77	24/8	13:00
黃竹坑	Wong Chuk Hang	東南偏東 ESE	92	24/8	20:13	東南偏東 ESE	36	24/8	13:00
						東南偏東 ESE	36	24/8	20:00

表 3.3.2 科羅旺影響香港期間，香港天文台總部及其他各站所錄得的日雨量(單位爲毫米)

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

站 (參閱圖3.3.2) Station (see Fig. 3.3.2)	八月二十三日 23 August	八月二十四日 24 August	八月二十五日 25 August	總雨量 Total
香港天文台 Hong Kong Observatory	2.0	77.5	60.9	140.4
H12 半山區 Mid Levels	4.5	93.0	52.0	149.5
H19 筲箕灣 Shau Kei Wan	4.0	93.5	30.0	127.5
H21 淺水灣 Repulse Bay	1.0	84.5	55.5	141.0
K04 佐敦谷 Jordan Valley	0.0	108.5	39.5	148.0
K06 蘇屋邨 So Uk Estate	1.5	103.5	55.0	160.0
N05 粉嶺 Fanling	1.0	50.5	56.0	107.5
N06 葵涌 Kwai Chung	0.5	122.0	69.0	191.5
N09 沙田 Sha Tin	0.0	65.5	64.5	130.0
N12 元朗 Yuen Long	0.0	62.5	32.0	94.5
N13 糧船灣 High Island	0.5	28.5	23.5	52.5
N17 東涌 Tung Chung	4.0	70.0	157.5	231.5
R21 踏石角 Tap Shek Kok	3.5	53.0	134.5	191.0
R26 石崗 Shek Kong	1.0	77.0	63.5	141.5
R31 大尾篤 Tai Mei Tuk	1.0	[26.0]	54.0	[81.0]

註： [ ] 基於不完整的每小時雨量數據。

Note : [ ] based on incomplete hourly data.

表 3.3.3 科羅旺影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮

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

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	2.59	25/8	05:52	0.57	24/8	18:09
石壁 Shek Pik	2.69	25/8	05:36	0.66	24/8	22:53
大埔滘 Tai Po Kau	2.53	25/8	05:41	0.69	24/8	15:10
尖鼻咀 Tsim Bei Tsui	2.96	25/8	07:14	0.69	24/8	16:59

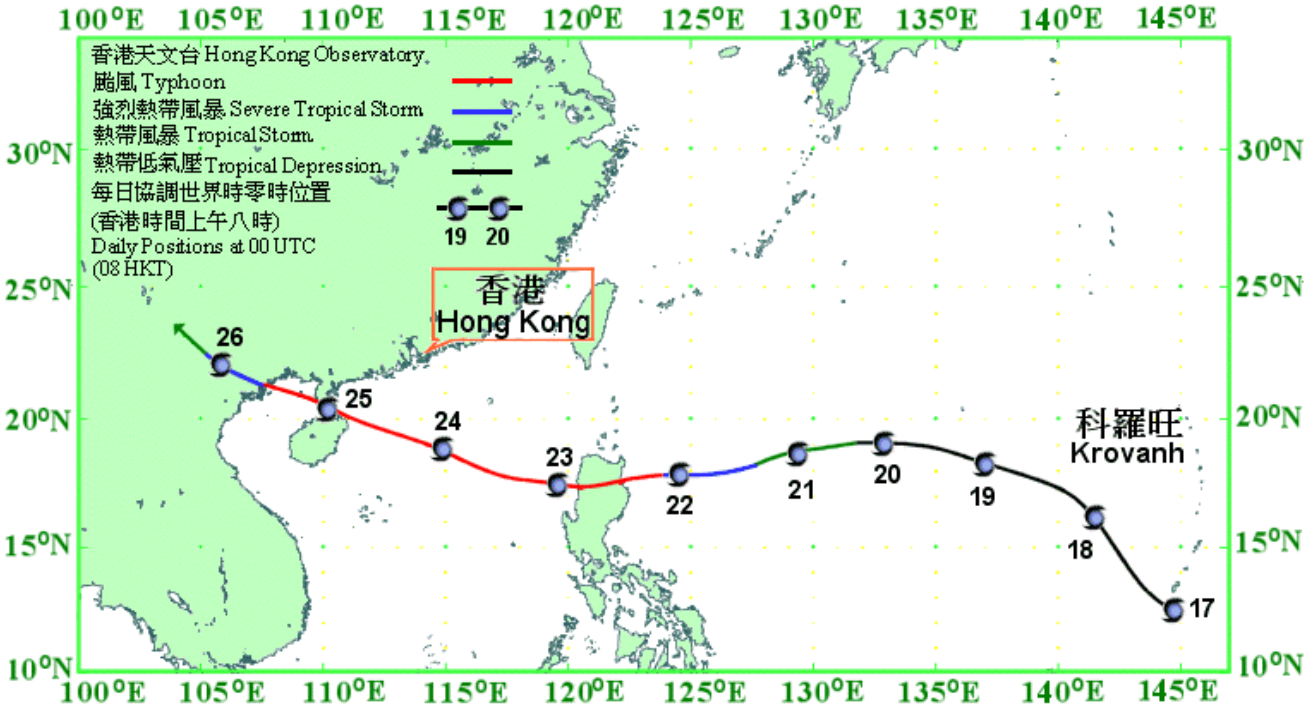

圖 3.3.1　　二零零三年八月十七日至二十六日科羅旺（0312）的路徑圖。

Figure 3.3.1　　Track of Krovanh (0312) : 17 – 26 August 2003.

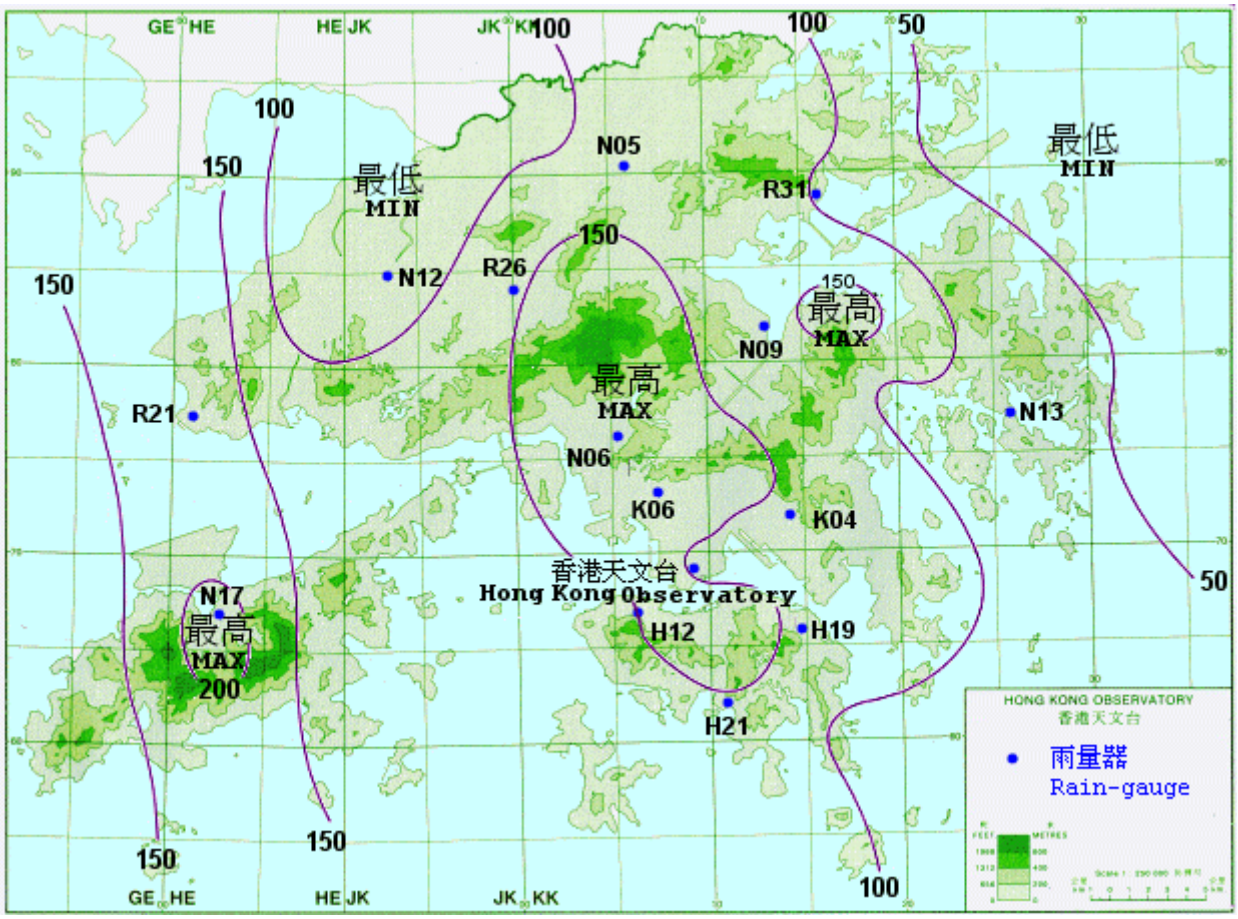

圖 3.3.2　　二零零三年八月二十三日至二十五日的雨量分佈 (等雨量線單位爲毫米)。

Figure 3.3.2　　Rainfall distribution on 23 - 25 August 2003 (isohyets are in millimetres).

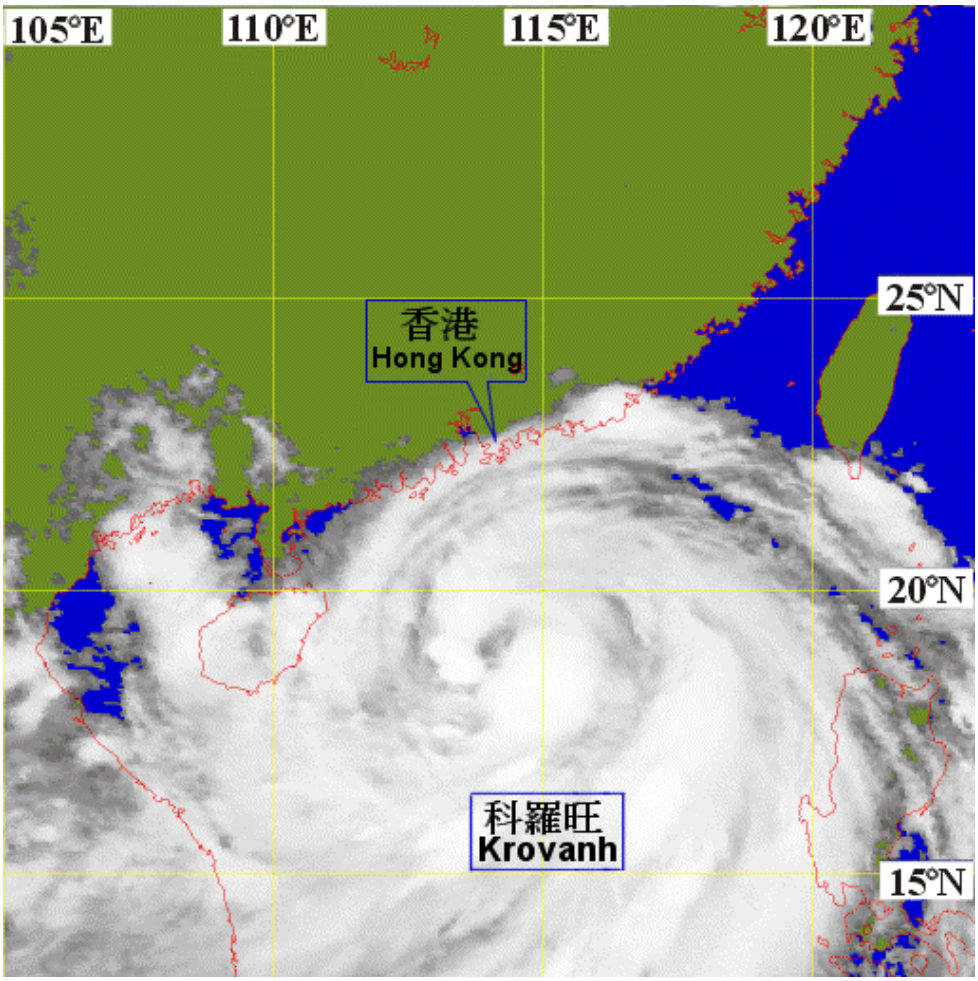

圖 3.3.3 二零零三年八月二十四日約上午10時30分的紅外線衛星圖片，顯示當時科羅旺位於香港以南約380公里。
〔此衛星圖像接收自地球同步業務環境衛星(GOES-9)。GOES-9是日本氣象廳(JMA)和美國國家海洋及大氣管理局(NOAA)轄下的國家環境衛星數據及資訊服務處 (NESDIS)合作下的成果〕

Figure 3.3.3 Infra-red imagery at around 10.30 a.m. on 24 August 2003 showing that Krovanh was located at about 380 km south of Hong Kong.
[The satellite imagery was originally captured with Geostationary Operational Environmental Satellite (GOES-9) which is operated by the joint effort of Japan Meteorological Agency (JMA) and National Environmental Satellite Data and Information Service (NESDIS) of US National Oceanic and Atmospheric Administration (NOAA)]