

### 3.3 強颱風彩虹(1522)：二零一五年十月一日至五日

彩虹是香港天文台在二零一五年第三個需要發出熱帶氣旋警告信號的熱帶氣旋。

熱帶低氣壓彩虹於十月一日下午在馬尼拉以東約290公里的菲律賓以東海域上形成，採取西北偏西路徑移向呂宋。翌日早上彩虹進入南海並增強為熱帶風暴。其後兩天彩虹穩定地向西北偏西方向移動，靠近廣東西部，並繼續增強。彩虹於十月四日凌晨發展為強颱風，正午前達到其最高強度，中心附近最高持續風速估計為每小時175公里。彩虹當日下午在廣東湛江附近登陸並逐漸減弱，最後於十月五日下午在廣西減弱為一個低壓區。

根據報章報導，彩虹吹襲廣東及廣西期間，兩省最少有460萬人受災，8 500多間房屋受損，直接經濟損失超過120億元人民幣。在彩虹的環流影響下，佛山順德及廣州番禺受龍捲風吹襲，多間房屋損毀，車輛被吹翻，至少六人死亡及超過200人受傷。澳門亦有多宗塌樹報告及高空墜物意外，低窪地區出現水浸。一艘貨船在香港西面約210公里處擱淺，船上14位船員全部獲救。

由於彩虹逐漸靠近廣東沿岸，香港天文台於十月二日下午8時40分發出一號戒備信號，當時彩虹集結在香港之東南偏南約 670公里。隨著彩虹繼續靠近香港，天文台於十月三日上午10時20分發出三號強風信號，當時彩虹位於本港之東南偏南約410公里。當日下午本港風力顯著增強，普遍吹達強風程度的東至東北風，離岸及高地間中吹烈風。天文台總部於當日下午3時37分錄得最低瞬時海平面氣壓1009.7百帕斯卡，當時彩虹位於香港以南約370公里。彩虹於十月三日晚上9時左右最接近香港，在香港之西南偏南約320公里附近掠過。當晚及翌日早上本地仍普遍吹達強風程度的東至東南風，離岸及高地間中吹烈風。

隨著彩虹於十月四日下午移入內陸並減弱，本港風力普遍開始緩和，天文台於下午8時40分改發一號戒備信號，取代三號強風信號。雖然彩虹進一步減弱及遠離香港，在彩虹及中國東南沿岸一道高壓脊的共同影響下，本港離岸和高地仍然吹強風，十月五日上午5時20分天文台發出強烈季候風信號取代一號戒備信號，直至下午3時30分才取消。

彩虹吹襲香港期間，尖鼻咀錄得3.08米的最高潮位(海圖基準面以上)及0.64米的最大風暴潮(天文潮高度以上)。

十月二日本港部分時間有陽光及有幾陣驟雨。受到彩虹的雨帶影響，本港天氣在十月三日下午開始轉壞，有狂風驟雨。隨後兩天本港仍然密雲，間中有狂風大驟雨及雷暴，天文台在十月三日及四日曾兩度發出黃色暴雨警告信號。在十月二日至五日四天期間，各區普遍錄得超過150毫米雨量，大嶼山西南部的雨量更超過250毫米。

彩虹吹襲本港期間，至少有30棵樹被吹倒及有14宗水浸報告。粉嶺火車站架空電纜受塌樹影響，列車服務一度受阻。香港國際機場有39班航班需要轉飛其它地方。

表3.3.1 - 3.3.4分別是彩虹影響香港期間各站錄得的最高風速、持續風力達到強風程度的時段、香港的日雨量及最高潮位資料。圖3.3.1 - 3.3.4分別為彩虹的路徑圖、本港的雨量分佈圖、彩虹的衛星及相關雷達圖像。

### 3.3 Severe Typhoon Mujigae (1522) : 1 – 5 October 2015

Mujigae was the third tropical cyclone necessitating the issuance of tropical cyclone warning signals by the Hong Kong Observatory in 2015.

Mujigae formed as a tropical depression over the sea areas east of the Philippines about 290 km east of Manila on the afternoon of 1 October and tracked west-northwestwards in the direction of Luzon. Mujigae entered the South China Sea the next morning and intensified into a tropical storm. Moving west-northwestwards steadily, it edged closer to western Guangdong and continued to intensify in the next two days. Mujigae developed into a severe typhoon in the small hours of 4 October, reaching its peak intensity before noon with an estimated sustained wind of 175 km/h near its centre. It made landfall near Zhanjiang in Guangdong that afternoon and weakened gradually. Mujigae finally degenerated into an area of low pressure on the afternoon of 5 October over Guangxi.

According to press reports, at least 4.6 million people were affected and 8 500 houses were damaged in Guangdong and Guangxi during the passage of Mujigae, with direct economic loss amounting to over 12 billion RMB. Under the influence of the circulation of Mujigae, Shunde district in Foshan and Panyu district in Guangzhou were affected by tornadoes, resulting in at least six deaths and over 200 injuries. Houses were damaged and vehicles were overturned. In Macao, there were numerous reports of fallen trees and incidents of blown down objects, with flooding in low-lying areas. A vessel ran aground about 210 km west of Hong Kong and all 14 crew members on board were rescued.

As Mujigae gradually edged closer to the coast of Guangdong, the Standby Signal No. 1 was issued at 8:40 p.m. on 2 October when Mujigae was about 670 km south-southeast of Hong Kong. As it continued to move closer to the territory, the Strong Wind Signal No. 3 was issued at 10:20 a.m. on 3 October when Mujigae was about 410 km south-southeast of Hong Kong. East to northeasterly winds strengthened significantly over Hong Kong in the afternoon, becoming generally strong and occasionally reaching gale force offshore and on high ground. At the Hong Kong Observatory Headquarters, the lowest instantaneous mean sea-level pressure of 1009.7 hPa was recorded at 3:37 p.m. on 3 October when Mujigae was about 370 km to the south. Mujigae came closest to the territory around 9 p.m. that night, skirting past around 320 km south-southwest of Hong Kong. Local winds remained generally strong from the east to southeast with occasional gales offshore and on high ground during the night and the next morning.

With Mujigae moving inland and weakening gradually on the afternoon of 4 October, local winds started to subside gradually. The Strong Wind Signal No. 3 was replaced by the Standby Signal No. 1 at 8:40 p.m. on 4 October. Although Mujigae further weakened and moved away from Hong Kong, winds were still strong offshore and on high ground under the combined effect of Mujigae and a ridge of high pressure along the coast of southeastern China. The Strong Monsoon Signal replaced the Standby Signal No. 1 at 5:20 a.m. on 5 October and lasted till 3:30 p.m. that day.

Under the influence of Mujigae, a maximum sea level (above chart datum) of 3.08 m and a maximum storm surge of 0.64 m (above astronomical tide) were recorded at Tsim Bei Tsui.

There were sunny periods and a few showers in Hong Kong on 2 October. Under the influence of the rainbands associated with Mujigae, local weather started to deteriorate with squally showers in the afternoon on 3 October. The weather remained cloudy to overcast with occasional heavy squally showers and thunderstorms in the following two days. The Amber Rainstorm Warning Signals were issued twice on 3 and 4 October. More than 150 millimetres of rainfall were generally recorded during the four-day period from 2 to 5 October. Rainfall over the southwestern part of Lantau Island even exceeded 250 millimetres.

In Hong Kong, at least 30 trees were blown down and 14 incidents of flooding were reported during the passage of Mujigae. Overhead cables near Fanling train station were affected by a fallen tree, resulting in a disruption of train services. At the Hong Kong International Airport, 39 aircraft were diverted.

Information on the maximum wind, period of strong force winds, daily rainfall and maximum sea level reached in Hong Kong during the passage of Mujigae is given in Tables 3.3.1 - 3.3.4 respectively. Figures 3.3.1 - 3.3.4 show respectively the track of Mujigae, the rainfall distribution for Hong Kong, a satellite imagery and a radar imagery of Mujigae.

表 3.3.1 在彩虹影響下，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 Mujigae 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)	東南	SE	81	4/10	09:02	東南偏東	ESE	52	4/10	09:00
中環碼頭	Central Pier	東	E	79	3/10	22:47	東	E	40	3/10	17:00
長洲	Cheung Chau	東南偏東	ESE	118	4/10	07:07	東南偏東	ESE	76	4/10	09:00
長洲泳灘	Cheung Chau Beach	東	E	106	4/10	08:53	東	E	67	4/10	09:00
青洲	Green Island	南	S	96	3/10	21:46	東北	NE	54	3/10	14:00
香港國際機場	Hong Kong International Airport	東南	SE	77	4/10	08:50	東南偏東	ESE	45	4/10	09:00
啟德	Kai Tak	東	E	81	4/10	08:14	東南偏東	ESE	40	4/10	09:00
京士柏	King's Park	東南	SE	70	4/10	04:29	東南偏東	ESE	30	4/10	07:00
流浮山	Lau Fau Shan	東北偏東	ENE	63	4/10	01:12	東北偏東	ENE	27	4/10	02:00
昂坪	Ngong Ping	東	E	153	4/10	08:34	東	E	99	4/10	09:00
北角	North Point	東	E	70	4/10	02:22	東北偏東	ENE	40	3/10	20:00
坪洲	Peng Chau	東南	SE	79	3/10	21:50	東	E	51	4/10	07:00
西貢	Sai Kung	東南偏南	SSE	75	4/10	03:35	東北偏東	ENE	40	3/10	20:00
沙洲	Sha Chau	東南	SE	87	4/10	09:13	東南	SE	54	4/10	10:00
沙螺灣	Sha Lo Wan	東南偏東	ESE	99	4/10	08:34	東北偏東	ENE	38	4/10	09:00
沙田	Sha Tin	北	N	58	4/10	07:53	東南	SE	20	4/10	18:00
石崗	Shek Kong	東	E	72	4/10	08:03	東	E	27	4/10	08:00
九龍天星碼頭	Star Ferry (Kowloon)	東南偏東	ESE	99	4/10	07:57	東南偏東	ESE	43	4/10	09:00
打鼓嶺	Ta Kwu Ling	東	E	54	4/10	08:49	東	E	22	4/10	12:00
大美督	Tai Mei Tuk	東	E	94	4/10	08:11	東南偏東	ESE	62	4/10	09:00
大帽山	Tai Mo Shan	東南	SE	137	4/10	08:22	東南	SE	87	4/10	18:00
大埔滘	Tai Po Kau	東南	SE	85	4/10	09:06	東南偏東	ESE	47	4/10	09:00
塔門	Tap Mun	東南偏東	ESE	70	4/10	09:35	東南偏東	ESE	34	4/10	10:00
大老山	Tate's Cairn	東南偏東	ESE	112	4/10	08:12	東	E	67	4/10	01:00
							東	E	67	4/10	03:00
將軍澳	Tseung Kwan O	東北偏東	ENE	59	3/10	19:52	北	N	16	3/10	17:00
青衣島蜆殼油庫	Tsing Yi Shell Oil Depot	東南	SE	68	4/10	08:04	東南偏東	ESE	25	4/10	08:00
		東	E	68	4/10	10:40					
屯門政府合署	Tuen Mun Government Offices	東南	SE	76	4/10	08:16	東南	SE	23	4/10	12:00
							東南	SE	23	4/10	15:00
橫瀾島	Waglan Island	東北偏東	ENE	96	3/10	16:50	東北偏東	ENE	72	3/10	16:00
		東北偏東	ENE	96	3/10	16:51	東北偏東	ENE	72	3/10	17:00
濕地公園	Wetland Park	東南偏東	ESE	56	4/10	12:42	東南	SE	22	4/10	20:00
黃竹坑	Wong Chuk Hang	東南偏東	ESE	85	4/10	06:04	東	E	31	4/10	06:00

平洲- 沒有資料 Ping Chau- data not available

表 3.3.2 在彩虹影響下，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程度的時段

Table 3.3.2 Periods during which sustained strong force winds were attained at the eight reference anemometers in the tropical cyclone warning system when the tropical cyclone warning signals for Mujigae were in force

站 (參閱圖 1.1) Station (See Fig. 1.1)		最初達到強風*時間 Start time strong wind speed* was reached		最後達到強風*時間 End time strong wind speed* was reached	
		日期/月份 Date/Month	時間 Time	日期/月份 Date/Month	時間 Time
長洲	Cheung Chau	3/10	12:19	5/10	05:20
香港國際機場	Hong Kong International Airport	3/10	14:34	5/10	03:09
啟德	Kai Tak	3/10	23:02	4/10	09:20
西貢	Sai Kung	3/10	18:54	4/10	09:17

流浮山、沙田、打鼓嶺及青衣島蜆殼油庫的持續風力未達到強風程度。

The sustained wind speed did not attain strong force at Lau Fau Shan, Sha Tin, Ta Kwu Ling and Tsing Yi Shell Oil Depot.

\* 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

註： 本表列出持續風力最初及最後達到強風程度的時間。其間，風力可能高於或低於指定的風力。

Note: The table gives the first and last time when strong winds were recorded. Note that the winds might fluctuate above or below the specified wind speeds in between the times indicated.

表 3.3.3 彩虹影響香港期間，香港天文台總部及其他各站所錄得的日雨量  
Table 3.3.3 Daily rainfall amounts recorded at the Hong Kong Observatory Headquarters and other stations during the passage of Mujigae

站 (參閱圖 3.3.2)		十月二日	十月三日	十月四日	十月五日	總雨量 (毫米)
Station (See Fig. 3.3.2)		2 Oct	3 Oct	4 Oct	5 Oct	Total (mm)
香港天文台 Hong Kong Observatory		7.0	46.4	38.1	15.6	107.1
香港國際機場 Hong Kong International Airport (HKA)		微量 Trace	47.6	131.3	9.3	188.2
長洲 Cheung Chau (CCH)		0.0	78.5	49.5	14.5	142.5
H23	香港仔 Aberdeen	0.0	61.0	27.5	13.0	101.5
N05	粉嶺 Fanling	0.0	74.0	43.0	66.0	183.0
N13	糧船灣 High Island	3.0	34.0	25.0	74.5	136.5
K04	佐敦谷 Jordan Valley	4.0	66.5	47.0	17.5	135.0
N06	葵涌 Kwai Chung	6.0	68.0	50.0	35.5	159.5
H12	半山區 Mid Levels	3.5	42.0	37.0	11.5	94.0
SHA	沙田 Sha Tin	20.5	70.5	[39.0]	[56.5]	[186.5]
H19	筲箕灣 Shau Kei Wan	4.0	41.0	34.5	9.0	88.5
SEK	石崗 Shek Kong	12.5	[80.5]	68.5	[29.5]	[191.0]
K06	蘇屋邨 So Uk Estate	8.0	62.5	41.0	24.0	135.5
R31	大美督 Tai Mei Tuk	3.0	34.5	51.5	91.0	180.0
R21	踏石角 Tap Shek Kok	4.0	53.5	56.5	9.5	123.5
N17	東涌 Tung Chung	0.0	64.5	166.5	23.0	254.0

註: [ ] 基於不齊全的每小時雨量數據。 Note: [ ] based on incomplete hourly data.

元朗 (R27) - 沒有資料。 Yuen Long (R27) - data not available.

表 3.3.4 彩虹影響香港期間，香港各潮汐站所錄得的最高潮位及最大風暴潮  
Table 3.3.4 Times and heights of the maximum sea level and the maximum storm surge recorded at tide stations in Hong Kong during the passage of Mujigae

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	2.62	4/10	00:19	0.47	3/10	22:45
石壁	Shek Pik	2.88	4/10	00:02	0.58	4/10	00:02
大廟灣	Tai Miu Wan	2.51	3/10	22:15	0.45	3/10	22:15
大埔滘	Tai Po Kau	2.62	3/10	01:06	0.53	4/10	00:02
尖鼻咀	Tsim Bei Tsui	3.08	4/10	00:26	0.64	4/10	00:24
橫瀾島	Waglan Island	2.62	3/10	22:29	0.39	3/10	22:27

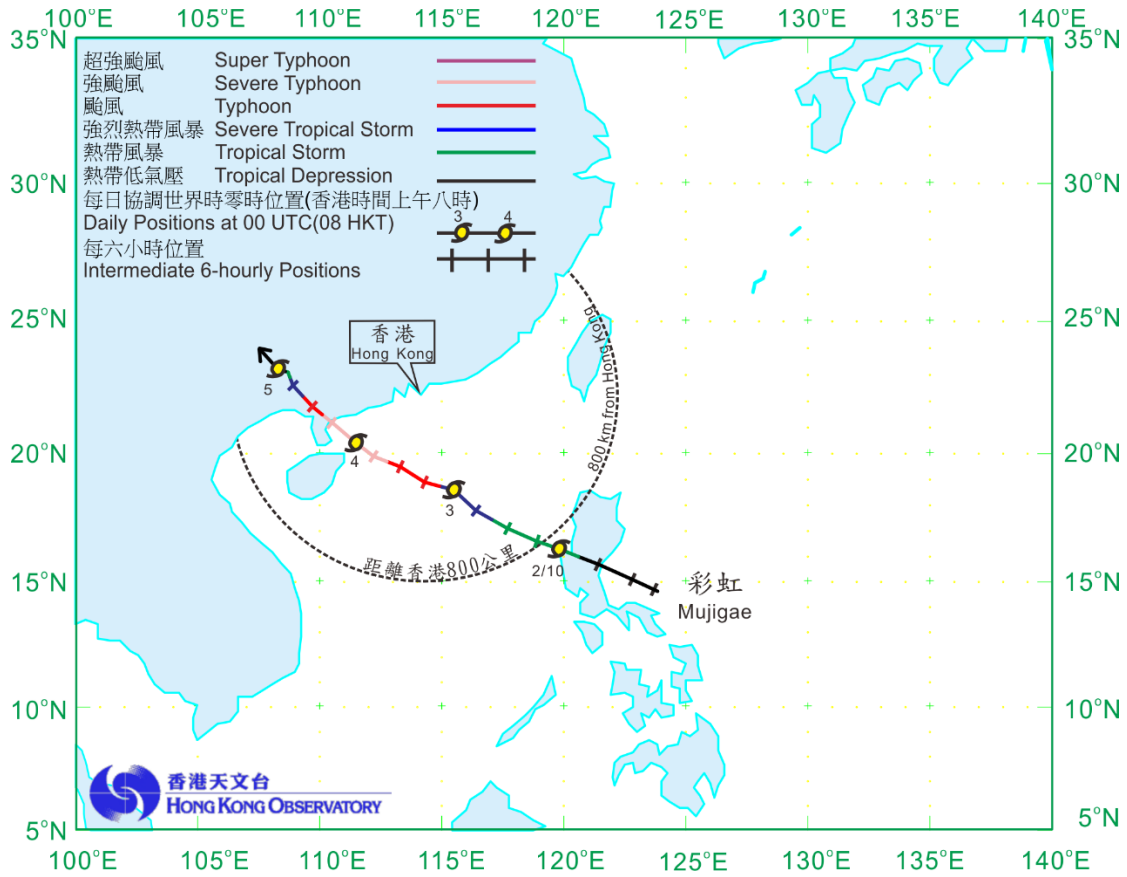


圖 3.3.1 二零一五年十月一日至五日彩虹 (1522)的路徑圖。  
 Figure 3.3.1 Track of Mujigae (1522): 1 – 5 October 2015.

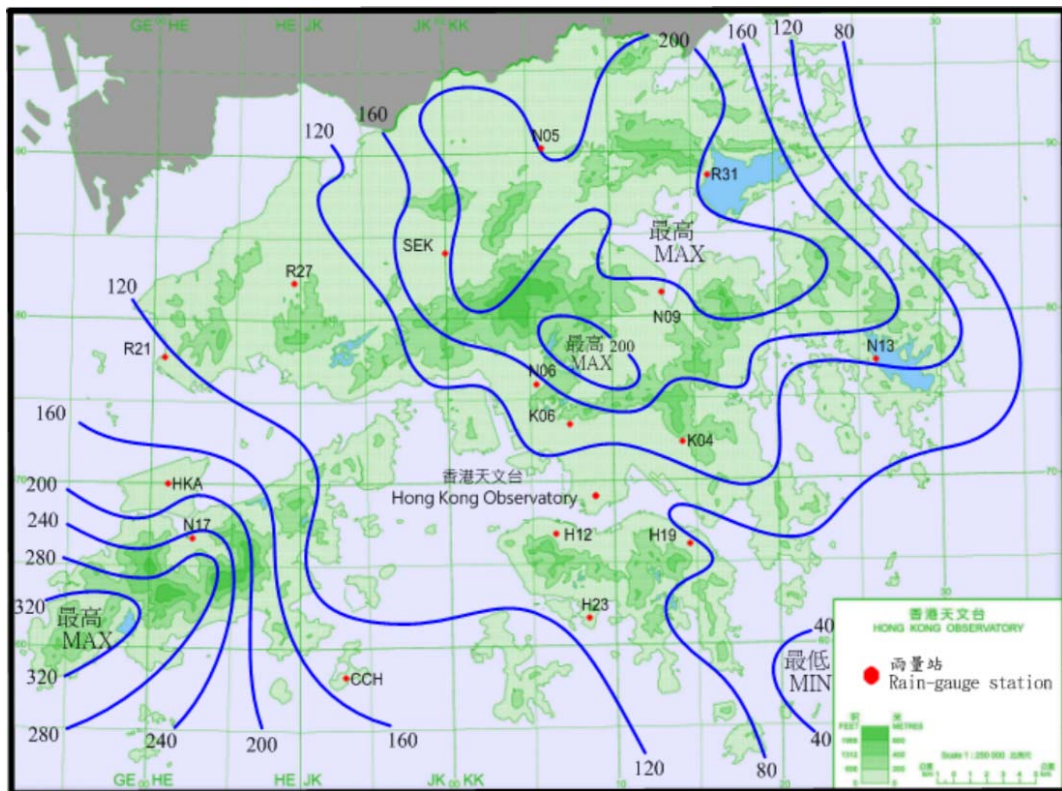


圖 3.3.2 二零一五年十月二日至五日的雨量分佈(等雨量線單位為毫米)。  
 Figure 3.3.2 Rainfall distribution on 2 – 5 October 2015 (isohyets are in millimetres).



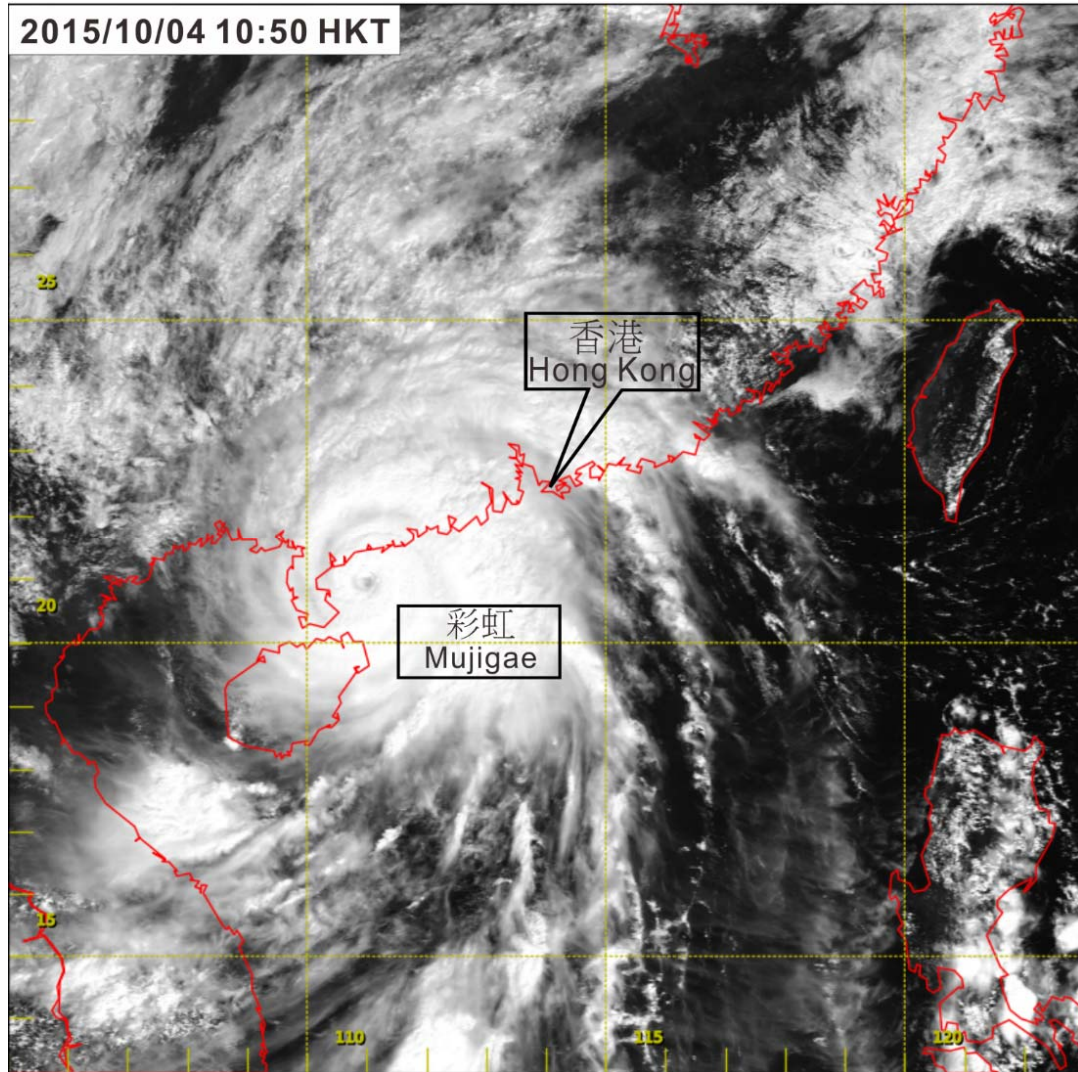


圖 3.3.3 二零一五年十月四日上午 10 時 50 分的可見光衛星圖片，當時彩虹達到其最高強度，中心附近最高持續風速估計為每小時 175 公里。彩虹的風眼在衛星圖上清晰可見。

Figure 3.3.3 Visible satellite imagery around 10:50 a.m. on 4 October 2015 when Mujigae was at its peak intensity with estimated maximum sustained winds of 175 km/h near its centre. The eye of Mujigae was clearly discernible on the satellite image.

〔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 (H-8) of Japan Meteorological Agency (JMA).]

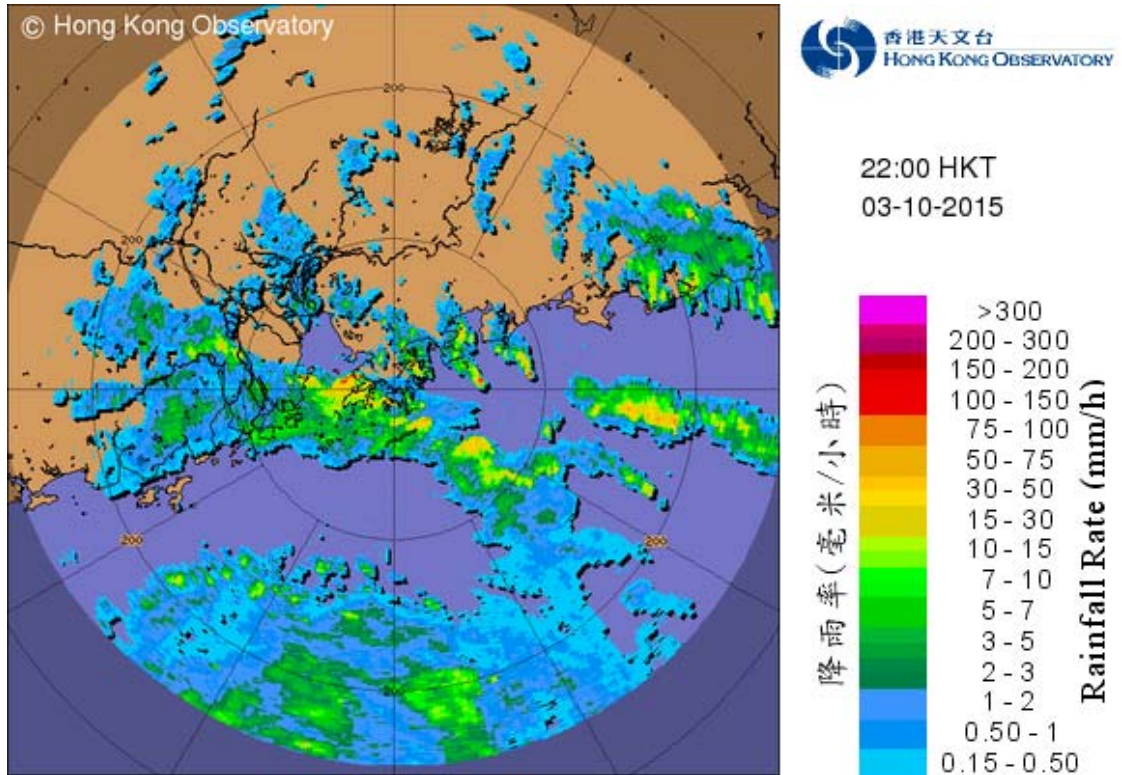


圖 3.3.4 二零一五年十月三日下午 10 時的雷達回波圖像，顯示彩虹的外圍雨帶正影響本港。當時彩虹的中心集結在香港之西南偏南約 320 公里。

Figure 3.3.4 Radar echoes captured at 10 p.m. on 3 October 2015, with the outer rainbands of Mujigae affecting Hong Kong and the centre of Mujigae located about 320 km to the south-southwest of Hong Kong.