

# Northeast New Territories Geopark Tour Commentary

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- Hong Kong Global Geopark of China
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## Preface

The Northeast New Territories is truly one of Hong Kong's hidden treasures. This 3,000-hectare region is part of the Hong Kong Geopark and represents the most comprehensive stratigraphy of sedimentary rocks in Hong Kong, ranging from 400-million-year-old Devonian sandstone and conglomerate to 55-million-year-old tertiary siltstone, and is rich in landforms resulting from different erosion processes. Splendid landscape, abundant history and culture and high bio-diversity, blending with unique geological features in the region, make this boat trip more amazingly fantastic.

## Section 1 – From Ma Liu Shui pier to Lai Chi Wo (馬料水至荔枝窩船程)

### Geography of Northeast New Territories

The northeastern part of New Territories covers an area of about 198km<sup>2</sup>, and is the least developed area in Hong Kong.

30 out of the 260 outlying islands in Hong Kong are in the northeastern part of New Territories. The Crooked Island is the largest among all and its area is around 2.35 km<sup>2</sup>.

Most of these islands are uninhabited with the exception of Crooked Island, Grass Island, Ap Chau and Tung Ping Chau. Crooked Island has the largest population of around 200.

In order to protect the natural resources in this area, 3 country parks, 2 special areas and 2 marine parks have been designated. The total of 3 country parks is around 8,349 hectares in size, which accounts for 1/5 of the total area of country parks in Hong Kong (41,034 hectares).

With the vast green resources, it is sometimes known as the “second back garden” of Hong Kong after Sai Kung.

### Ma On Shan (馬鞍山)

“Ma On Shan” is named after the saddle-shaped peak in Cantonese. Its contour is easily recognized near Ma Liu Shui pier.

Ma On Shan New Town is scattered with high-rise buildings, with a population of about 250,000. Behind the skyscrapers, there is an abandoned quarry which was once Hong Kong's largest quarry in which iron ore were mined there. Ma On Shan is a typical example of a “skarn<sup>1</sup>-type” (矽卡岩型) iron reserve. The Ma On Shan iron ore is a 500-metre-long lenticular orebody situated at the western flank of Ma On Shan, and was initially prospected in 1906. The principal ore mineral was magnetite (磁鐵礦) and it contained 32% iron on average. During the prosperous period in the 60s, the mining staff, together with their family members, were up to 50,000. The quarry was closed down in 1976.

Ma On Shan boasts the 7<sup>th</sup> highest peak (702m) in Hong Kong and is also known as Kei Ling (企嶺) because of its steep slope at the eastern part of Ma On Shan.

<sup>1</sup>Skarn – a metamorphic zone developed when igneous intrusions were in contact with carbonate sedimentary rocks under metasomatism (a metamorphic process)

Ma On Shan was once an undeveloped rural area and today the once sleepy countryside is now well connected by new road network and the railway system.

### **Ma Shi Chau (馬屎洲)**

Ma Shi Chau is an outdoor classroom for geology studies. There is a tombolo (連島沙洲) formed by sediment deposits connecting Ma Shi Chau and the nearby island, Yim Tin Tsai. Ma Shi Chau hosts the largest exposure of Permian sedimentary rocks in Hong Kong. The complicated deformation of sedimentary rocks reveals how the nature shaped rock into various forms, with folded layers, fractured or as displaced rocks. All these features record the past active tectonic movements in Ma Shi Chau. Various coastal features such as wave-cut platform (海蝕平台), folding (褶皺) and fault line (斷層) are found on the island. If you are lucky, you may even encounter marine fauna fossils and terrestrial flora fossils there.

In April of 1999, Ma Shi Chau has been designated as a special area by the country park authority (受保護的特別地區) and a nature trail has been constructed with interpretation plates, illustrating the geological features along the trail. This is a must-go field trip for geology students and lovers in Hong Kong.

### **Tang Chau (燈洲)**

A submerged rock found at the middle of Tolo Channel is called “Tang Chau” or Light Island. A lighthouse is standing on the small island to beacon ships and boats. The small pier is for the engineers’ use to repair the lighthouse. There are many herons and egrets including little egrets, great egrets and black kites roost, especially in the evening.

### **Tolo Channel (赤門海峽)**

Tolo Channel was once the main sea route for fishermen on fishing trips to the South China Sea.

There are virgin hills and dense forests in the Plover Cove Country Park on the west, Sai Kung Country Park on the east, and Ma On Shan Country Park on the south.

Geologically speaking, Tolo Channel is one of the major fault lines of Hong Kong. There are hundreds of fault lines recognized with variable lengths, ranging from metres to tens of kilometres. The longest fault in Hong Kong is the northeast-to-southwest Lai Chi Kok-Tolo Harbour Fault Zones, extending from Tolo Harbour to west Kowloon.

The geology is totally different on both sides of Tolo Channel – volcanic rock on the southern side and sedimentary rock on the northern side. The west of the Channel is New Territories and the east is the Sai Kung Peninsula.

Significant discoveries of fossils in Hong Kong were found in Tolo Harbour. The first fossil in Hong Kong, an ammonite (香港菊石) (*Hongkongites hongkongensis*), was named after Hong Kong. This fossil was discovered embedded in the mudstone on the northern shore of Tolo Channel in 1924 and dated back to the age as Early Jurassic. This was also the first discovery of Mesozoic fossils in southeast Asia. Ammonites were an extinct group of marine mollusks in the class Cephalopoda and a close relative of the octopus and squid.

Another most significant finding was the discovery of Devonian fish fossils (placoderms 盾皮魚 – a primitive fish species with head and thorax covered by shield) in the Plover Cove area by Mr. C.M. Lee in 1980. The discovery of Devonian fossils was the first in Hong Kong, and established the age of the enclosing rocks to be about 400 million years old.

Many different types of fossils not only provide evidence of the age of the sedimentary strata, but also offer reliable indications of the depositional environments that existed in Hong Kong during the prehistoric period.

### **Plover Cove Reservoir (船灣淡水湖)**

The long concrete wall is found at the dam of the Plover Cove Reservoir, the first reservoir built in the sea over the world. The reservoir was originally an inlet. Owing to the rapid population growth in the 1950s, the demand for freshwater suddenly increased. The draught in 1963 was an unforgettably painful memory in the heart of the older generations in Hong Kong. During that time, water was rationed and there was only 4 hours of water supply in every 4 days. The British government then invested more than HK\$400 millions to construct the Plover Cove Reservoir. It took 8 years (from 1960 to 1968) to complete such a large-scale infrastructure.

The Plover Cove Reservoir is the largest reservoir in Hong Kong in terms of surface area. It is the second largest reservoir in Hong Kong in terms of water storage (230 million m<sup>3</sup>), whilst High Island Reservoir in Sai Kung (西貢萬宜水庫) is the largest reservoir of Hong Kong.

### **Pearls harvesting in Tai Po Hoi (Tai Po Sea) (大埔海所產的珍珠)**

The waters of Plover Cove and Tolo Harbour is known as Tai Po Hoi (Tai Po Sea). The sea has been bounded by mountains and makes it look like a huge lake. The local fishermen thus called it as Pearl Lake “媚珠池” or Pearl River “珍珠江”.

The sub-tropical climate of Hong Kong and the good water quality of Tai Po Hoi provided an ideal environment for pearl cultivation. The quality of pearl produced in Tai Po Hoi was the second best in China, just after the pearl produced in He Pu of Guangxi (廣西合浦), which is top quality pearl.

### **Fung Wong Wat police gate (鳳凰笏水警屏障)**

Fung Wong Wat is an elongated bay at the northern shore of the Tolo Channel. There was a pearl culture farm in 1950s but it was closed in early 1960s due to the construction work of Plover Cove Reservoir.

With the rocketing economic development and reforms in China in the 80s, there was a huge demand for imported electrical appliances. Smuggling was a very popular activity at that time and large amount of goods were smuggled to mainland China via the Tolo Channel. Meanwhile, illegal immigrants from Mainland China swam across the sea and entered the territory of Hong Kong. In view of the very serious issue, the police force narrowed the waterway of Tolo Channel by lining up floating balls so as to slow down speedy vessels and check the entry of the vessels to curb smuggling activities. The police gate is still in operation today, though smuggling is no longer a problem in our waters.

### **Pat Sin Leng (八仙嶺)**

Pat Sin Leng is not only a popular hotspot for trekkers but also for photographers. Its southern flank was once voted as one of the Hong Kong Best 10 Scenic Sites. The geology is dominated by the Cretaceous sedimentary rock, mainly conglomerate. Along some streams in the Pat Sin Leng Country Park, some fairly round and fist-sized pebbles in reddish brown matrix can be found. The distinctive reddish brown colour accounts for iron-rich cement straddled between the pebbles. The sedimentary rock of Pat Sin Leng was formed during the golden age of dinosaurs, but neither plant nor dinosaur fossils have been discovered in these sedimentary rocks yet.

In a topographical map of Hong Kong, Pat Sin Leng with eight peaks roughly trends in an east-west direction. This could be mostly shaped by the earth movement, resulting in tilting of the entire load of sedimentary layers. The northern flank of the range is gently dipping towards north while the southern flank is a steep slope, forming a prominent escarpment along the range.

### **Wong Chuk Kok Tsui (Bluff Head) (黃竹角咀)**

Wong Chuk Kok Tsui, also called Bluff Head, is an elongated peninsula situated at the northern tip of Tolo Channel formed during the Devonian period. As fossils provides crucial clues about the geological age and stratigraphy of the region, the sedimentary rocks of Bluff Head with the recently unearthed fish fossils (placoderms) could date back to some 400 million years ago (Devonian). These Devonian sedimentary rocks, called the Bluff Head Formation, are the oldest strata exposed in Hong Kong and crop out mainly along the coast of Tolo Channel, including primarily sandstones, siltstones and conglomerate, some of which are fossil-bearing.

At Bluff Head, the cliffs demonstrate the most complete sequence through the formation. Along the shoreline, various structures resulted from once intense tectonic movement can be seen, such as tightly folded layers, vertically-standing beddings or even some upside-down layers of rocks adjacent to the southern faulted margin. Besides, it is well-known for its highly-deformed sedimentary rocks and associated fossil assemblages. The two-metre-high Devil's Fist standing on the coast, which is the icon of Bluff Head, demonstrates how powerful the nature is. Diverse geological structures on Bluff Head are of top priority in the must-see list. These complicated deformation style is not common in Hong Kong.

### **Chek Chau (Port Island) (赤洲)**

Chek Chau, also known as Port Island, is a tiny isolated island sitting at the mouth of Tolo Channel in Mirs Bay formed during Late Cretaceous Period. It primarily comprises reddish brown conglomerate and conglomeratic sandstone. The Chinese name, Chek Chau, partly tells us its geological features. "Chek" denotes that most of the rocks on Chek Chau are red in colour, which is largely resulted from the oxidation of iron-rich sedimentary rocks into iron oxide in sandstone, conglomerate and siltstone in the late Cretaceous Period. The layers of those sedimentary rocks are clear and dip gently eastward into the sea. Together with grey volcanic rocks (tuff) to the western side of the island, it is apparent that a clear geological boundary separates these two rock types.

### **Double Island (往灣洲)**

Double Island is called “Wong Wan Chau” in Chinese. It has an area of 2.13 km<sup>2</sup>. The tranquil beach of Tung Wan on Double Island was the favourite beach of one of Hong Kong Governors – Sir MacLehose. He liked to cruise on the government launch – Lady Maurine to Tung Wan beach to swim and relax. Tung Wan is therefore called “Governor’s Bay [總督灣] or [督爺灣]”.

The only building standing on Double Island is the training centre of “Outward Bound Hong Kong”. Outward Bound helps people discover and develop their potential to care for themselves, others and the world around them through challenging experiences in unfamiliar settings.

### **Hung Shek Mun (紅石門)**

After sailing along the Tolo Channel, a boat will steer to the narrow channel and sail into Double Haven, the change of scenery is what visitors must not miss. The region in which the green hills and the surrounding uninhabited islands bound the calm waters is renowned as the Shangri-la of Hong Kong.

“Hung Shek Mun” is named after reddish rock forming its coastline. In Chinese, “Hung” means red in colour. The kind of rock belongs to the sandstone type of sedimentary rocks. The sediment appears reddish due to the oxidation of ferrous minerals in the iron-rich sediments.

Double Island is located on the eastern side of Hung Shek Mun with Kang Mun Tsui (乾門咀) on the western side. It is the narrowest gateway to the marine park with a width of less than 100 metres.

There are 4 gateways to the scenic Double Haven, the Shangri-la of Hong Kong.

- East – Chik Mun Tau 直門頭
- South – Hung Shek Mun 紅石門
- West – Tsing Chau Lek 青洲瀝
- North– Wang Mun Hoi 橫門海

A village, named Hung Shek Mun Village, was established at the western coast of Hung Shek Mun. A dam had been built at the entrance of the village for fishery and a fresh water reservoir was at the southern side of the village. The village is surrounded by dense vegetation and the reddish rock at the coastal region.

“Lo Sha Tin 老沙田” on Double Island is at the eastern coast of Hung Shek Mun. Owing to a shortage of freshwater on the island, the villagers irrigated the paddy fields by seawater to produce salty rice crops.

### **Crescent Island (娥眉洲)**

The shape of Crescent Island resembles letter “V” to western visitors. But to the local fisherman, it is like a pretty woman’s eyebrow, so its Chinese name is 娥眉. Crescent Island acts as a windbreak for Double Haven. The two sides of Crescent Island are the waterways to Double Haven - “Chik Mun Tau” of the south and “Wang Mun Hoi” of the north.

The quiet bay of Crescent Island, namely Crescent Bay 娥眉灣, is well-stocked with corals, and it is one of the most popular spots for diving trips.

### **Kat O (Crooked Island) (吉澳)**

The shape of the island is like the letter “Z”, so Crooked Island is named after its very crooked coastline. The Chinese name is Kat O, meaning a place of good fortune. This may have come from fishermen who took shelter in Crooked Island during stormy weather. The island is relatively isolated from other parts of New Territories.

The total area of Crooked Island is 2.35km<sup>2</sup> and its highest point is Wong Fong Shan (黃幌山) at 121 metres above sea level. Wong Fong Shan is considered a hill of good Fung Shui by villages of Crooked Island. The hill from a distance looks like the parasol that the emperor used during his tour of inspection and that is how its name comes from. On top of the hill, one can get an open view of Ng Tung Mountain in Shenzhen, Kat O Bay and several islands in Double Haven.

About 200 people are living on the island today, many are retired and some running small grocery shops and restaurants.

There is a stone tablet outside Tin Hau Temple with an inscription that says “By the order of His Excellency the Governor of Guangdong and Guangxi Provinces for permanent record.” The full text in 806 words was inscribed in 1802 and served as an important document for one special incident in the history of Crooked Island.

Some 200 years ago in the Qing Dynasty, the government imposed a tax on farmland. A landlord named Cheung Tang Nam (張騰南) had a conspiracy with the government officials and they illegally increased the rate and charged more taxes from the peasants. The poor farmers were angry about this conspiracy and brought a lawsuit against Cheung and other officials. They lost the lawsuit and were countercharged by the local government. A peasant Tsang Kee Jit (曾其捷) appealed to the Guangzhou Regional Government (廣州府) and won the case. Tsang had no choice but to further appeal to the Governor of Guangzhou and Guangxi Provinces. In the petition he started that, “Mr. Cheung Tang Nam imposed heavy tax and fees on the people who charged and had no way to defend themselves.” After investigation, the governor ordered that tax rate remained unchanged and extra fees would not be allowed. This order was inscribed on the stone tablet which is still standing in the same place until today.

## **Double Haven (Yan Chau Tong) (印洲塘)**

Double Haven is surrounded by Double Island (往灣洲), Crescent Island (娥眉洲) and Crooked Island (吉澳) and protected by the surrounding hills of the New Territories on the west.

The vista of protecting hills in all directions, inhabited islands on calm waters, peaceful bay headlands, rock cliffs and unspoilt coastline are proudly proclaimed as Shangri-la of Hong Kong.

Six treasures of Double Haven:

Thanks to the traditional Chinese thinking of people's quest for scholar achievement, the natural rock formation in the waters are imagined to resemble a collection of stationery used in Chinese calligraphy, namely:

- **Brush:** A sand spit below Wong Fong Shan that points to the southwest, and it is only visible at low tide
- **Brush rack:** A small island that resembles a brush rack
- **Ink slab:** The rough coastal rock cluster resemble an ink slab
- **Paper:** The sea is as calm and smooth as a piece of paper
- **Royal Seal:** An interesting island in the shape of Royal Seal
- **Parasol:** The cone-shaped summit of Wong Fong Shan looks like a parasol that the Emperor used for inspection tour of the city

## **Yan Chau Tong Marine Park (印洲塘海岸公園)**

Yan Chau Tong, also known as Double Haven, was designated as a marine park on 5 July 1996. There are four marine parks in Hong Kong including Yan Chau Tong Marine Park, Sha Chau and Lung Kwu Chau Marine Park, Hoi Ha Wan Marine Park and Tung Ping Chau Marine Park.

Yan Chau Tong Marine Park has two component parts:

- The first part covers the bay of Lai Chi Wo along the coastline of mainland that includes Sam A Tsuen and ends at Double Island with the southern end at Hung Shek Mun,
- The second part, lying next to Lai Chi Wo, starts at Chung Wan Tsui and extends all the way up the northern tip of Kau Lo Tau.

Double Haven is well known for its rich fishery resources. The two ecological habitats, mangroves and seagrass bed, are nursery ground for larvae and juveniles of fishes and many other marine lives.

## Section 2 – Walking Tour on Lai Chi Wo (荔枝窩岸上觀光)

### Lai Chi Wo

Lai Chi Wo is located along coastal area of Northeast New Territories, but is not an outlying island. Apart from getting to Lai Chi Wo by boat, visitors can walk the trail from the inland over the hills from Wu Kau Tang (烏蛟騰) to Lai Chi Wo, taking about 2-3 hours for a hike.

Lai Chi Wo was once a valley with many lychee trees, after which the village was named. Over the decades, many other trees were grown and most of the original lychee trees failed to survive. The plantation of Mandarin orange trees became much more popular in the 60s-70s. These festive trees for the Chinese New Year offered the village a better profit.

Lai Chi Wo Hakka village has a history of 300 years. Villagers there earned their living mainly by paddy rice cultivation and some of them engaged in fishing and selling bamboo products. The most prosperous period of Lai Chi Wo was in the 50s, with a population of up to 450 in more than 100 houses.

In the 60s, many villagers left for the United Kingdom, while other sought better living in the inland towns in Sha Tau Kok and Tai Po. Now we could only find one old lady residing in the village.

In recent years, with the popularity of ecotourism and the improved facilities for tourists there, more and more visitors pay a visit to Lai Chi Wo to appreciate the ecologically-valued sites during weekends, resulting in benefiting the local community. Some villagers are lured to migrate back to the village to sell drinks or snacks during weekends.

### 1) Traditional Hakka Culture & Heritage

#### Hok Shan Monastery and Hip Tin Temple (鶴山寺與協天宮)

Three buildings stand right at the plaza of Lai Chi Wo Village – Hok Shan Monastery, Hip Tin Temple and Siu Ying School. Hok Shan Monastery is dedicated to Guanyin while Hip Tin Temple is for Guandi. Both structures built in Qing Dynasty are listed as Grade 2 historic buildings in Hong Kong.

#### Old Cannons

Pirates were very active in the waters around Lai Chi Wo. They usually gave a few days notice to the villagers before the bandits marched in to rob the village. That was called “Daylight Robbery”. Every time a notice was received, women and children were sent to hide in the fung shui wood. Male villagers, on the other hand, would set up guns and cannons, and fired the robbers with home-made gunpowder to defend their home and properties.

The last firing of these cannons was some 50 years ago. Lai Chi Wo remains a peaceful hamlet since then. Today, only two of those cannons were remained and they remind the villagers of the battle their ancestors fought.

### **Ancestral hall (祠堂)**

There are two ancestral halls in Lai Chi Wo village belonging to the Tsang and Wong families. Every villager of Hakka decent, no matter how poor or rich, has his/her own ancestral hall in the village centre. They worship their ancestors on the first and fifteenth day of every month of the Lunar calendar and at the ancestral hall for different ceremonies.

### **Lai Chi Wo Hakka Village (荔枝窩村)**

Lai Chi Wo is a traditional Hakka village. It is positioned west and facing east with a dense fung shui wood at the back of the village. A plaza was built in front of the village and it is called “Wo Ping 禾坪” for basking crops and recreation purpose. Fung shui wall was built in three sides of the village, aimed to congregate wealth and protect the village from evil.

In the plaza, there is a stone board craved with the characters 慶春約七村廣場, which means “The Plaza of the 7 villages of Hing Chun Yeuk”. More than 50 villages can be found in Sha Tau Kok Heung. In order to enhance the communication and defending, Ten Yeuks (Union of villages 沙頭角十約) were formed. Hing Chun Yeuk 慶春約 is a union of villages in the localities and it is composed of 7 villages including:

- Lai Chi Wo 荔枝窩
- Sam A 三桎
- Mui Tsz Lam 梅子林
- Kap Tong 蛤塘
- Ngau Chi Wu 牛池湖
- So Lo Pun 鎖羅盤
- Siu Tan 小灘

All of them are Hakka villages.

In the New Territories, union of villages are formed to foster kinship and strengthen security.

There are two main entrances of the village which are positioned in the east and the west. East entrance is the front gate inscribed with “Zi Qi Dong Lai (紫氣東來)” across the front slab. It is the main entrance for the villagers’ daily activities. The west entrance was inscribed with “Xi Jie Xiang Guang (西接祥光)” across the front slab. It is the main entrance for wedding ceremony.

There were 9 horizontal lanes and 3 vertical lanes among houses. The lanes are very narrow in order to keep houses close to one another. The houses arranged in a tidy and neat way are also good for ventilation.

There are 211 houses in the village, of which 131 are single storey with slanted roofs. There are also 76 two-storey houses and 4 flat-roofed 4 storey houses. These houses are mostly made of blue and mud bricks.

The following are unique features of the Hakka houses in Lai Chi Wo:

- Door Pillar
- Incense holder outside the door
- Door knobs
- Window frames

The interior of these houses are very basic, with one side as the kitchen, the other side bathroom with a short wall as shelter and partition but without a door.

Most of the indigenous residents of the New Territories were early immigrants from Mainland China more than several hundred years ago. They lived close together for security reason and therefore villages were formed. The location of villages and style of architecture were all based on “Fung Shui” which is an ancient study of location or academically named geomancy to locate the best site for human settlement or for burial.

According to Fung Shui principle, the best location of housing settlement is surrounded by some water, a mountain at the back and a flatland in the front. Therefore, most of the “Hakka villages” in the New Territories are surrounded by hills and mountains.

In New Territories, much more than water and mountains, prominent old trees are thought to have supernatural power. It is a common phenomenon that Pak Kung (Earth God) shrines are placed under towering old trees. As villagers believe Pak Kung trees can keep the entire lineage from harm, Pak Kung trees are thought to guard at the main village entrance, like watching over the whole village.

## **II) Fung Shui Woodland (風水林)**

In order to improve the prosperity and protection of the village, the villagers planted vegetation at the back of the villages. As the fung shui wood matures, it will gradually take a crescent shape to embrace the village, just like a helmet over a head. The crescent shape of the forest acts as a barrier to provide additional protection or buffer. Villagers believe that the woodland could bring them luck and govern the prosperity and development of the village. The woodland is hence well conserved to make sure that it continues to generate good “Fung Shui”.

The Lai Chi Wo Fung Shui Woodland forms a substantial part of the wood with Plover Cove Country Park. It became a hot ecological determination in recent years because it has more than 100 species of plants such as five-fingered camphor, incense tree, autumn maple and Langkok Fig.

Villagers of Lai Chi Wo are strong believers in fung shui. They used every effort to protect their fung shui wood including setting boundaries and prohibiting any destruction of local forest. Anyone entering or causing damage to the fung shui wood is a serious offence and he/she will be fined and publicly condemned. Only a few days in a year the villagers are allowed to enter the woods to collect fallen sticks for firewood. This may be the reason why Lai Chi Wo’s fung shui wood remains lush and verdant today.

### **Function of Fung Shui Woodland (風水林的功能)**

Fung shui wood provides protection to the villages psychologically. Additionally, it is regarded as an important cultural and ecological resource. Fung shui wood can screen off devastating gale, the scorching sun and the dry chilly north wind. It can also reduce landslide risks by retaining floodwater and slipping mud. A dense broad-leaved forest is also a good fire-breaker that can stop hill fire from spreading. To maximize economic effectiveness, villagers often plant crops of commercial value on the fringes of the fung shui wood. These plants can provide food, medicine, firewood and building materials. Common plants found in fung shui wood included Lance-leaved Sterculia (*Sterculia lanceolata*)假蘋婆, Longan (*Dimocarpus heptaphyllia*)龍眼, Incense Tree (*Aquilaria sinensis*)土沉香, Ivy Tree (*Schefflera heptaphylla*)銀柴, Hance's Syzygium (*Syzygium hancei*)韓氏蒲桃 and Camphor Tree (*Cinnamomum camphore*)樟樹, etc.

### **The Hollow Tree (通心樹)**

There is a special "Hollow Tree" in the fung shui wood at the back of the Lai Chi Wo Village - Autumn Maple. Standing 21m, the bizarre looking tree is estimated to be more than 100 years old. There are openings in both the upper and bottom sections, and its trunk is hollow right through which can hold 2 to 3 petite people inside. There are more than ten hollows in the tree although we can only see the bark remained. It is still alive today.

### **Five-fingered Camphor (五指樟)**

Five-fingered Camphor is also located behind Lai Chi Wo Village and there is a wooden pathway leading to it. This century-old Camphor Tree measures some 25m tall and 3m in diameter. Five-fingered Camphor once had thick branches neatly arranged like the five fingers. It is said that during the Japanese Occupation, Lai Chi Wo was occupied as a military backup base. To prevent enemies from hiding in nearby forests, Japanese troops chopped down many trees in the area. While soldiers threatened to chop the Five-fingered Camphor, villagers stood up and protected it with their lives. They finally killed the traitors who worked for the Japanese but the Camphor became four-fingered.

Camphor has a lot of economic values. The wood is hard and scented which is a choice of material for furniture and boats. Besides, both the trunk and leaves contain camphor oil, which can be refined into insect repellent.

## **III. Wetland Ecology**

### **Wetland (濕地)**

Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. They are defined as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres, with reference to "Ramsar Convention".

The importance of wetlands has been recognized worldwide. Wetlands are an important player in our earth biosphere. It supports a rich array of animals and plants, and interacts with other ecosystems. It also provides essential resources and food to many life forms, including human.

Wetlands serve a number of important ecological functions:

- To support rich biodiversity
- To act as buffers to store flood water
- To reduce the damage of storm
- To store a huge amount of carbon from the atmosphere to combat the overwhelming situation of global warming
- To help purifying water, and reduce the impacts of waves to the shores
- To provide food and other natural resources
- To provide beautiful recreational places to human

Today, 153 governments, including Hong Kong, have become parties of the “Ramsar Convention” to commit conservation of the important wetlands in their territories.

The Hong Kong Government designated an area of approximately 1,500 hectares of Inner Deep Bay as a 'Wetland of International Importance' under the Ramsar Convention on 4 September, 1995. Located in the northwestern corner of Hong Kong, Mai Po Nature Reserve and Inner Deep Bay is Hong Kong’s largest remaining wetland and even an internationally renowned wetland. It is home to diverse habitats including intertidal mudflats, mangroves, traditional *gei wai*, reedbeds and fishing ponds. Its well-known reputation is achieved thanks to serving as a staging ground and wintering site for up to 100,000 migratory water birds each year. Over 350 bird species have been recorded in this area, of which 12 are globally endangered such as Black-faced Spoonbills.

In which of 380 hectares of wetland was designated as Mai Po Nature Reserve and actively managed by World Wide Fund For Nature Hong Kong (WWF Hong Kong) since 1984 for environmental education and conservation. Every year, this bird paradise also lures birdwatchers over the world to visit and enjoy.

### **Mangroves (紅樹林)**

Mangrove literally means “red trees” in Chinese, in which high levels of tannins found in the tissue of mangrove wood and leaves give a reddish colour like tea colour. They can be found in tropical and sub-tropical intertidal zones. Mangrove forest is an important habitat for a variety of organisms, especially water birds and marine animals. It is also a nursery and breeding ground for different marine organisms. Mai Po and Inner Deep Bay, which has a mangrove area of over 380 hectares, is the largest in Hong Kong and the sixth largest protected strand in China. Over 40,000 water birds (up to 68,000) are wintering there every year. In addition, mangrove stabilizes coastal land mass against sea erosion and even diminished the devastation against cyclones and tsunami.

There are 61 species of true mangrove in the world, of which 26 species and 8 species can be found in China and Hong Kong respectively. The mangroves in the northeastern part of New Territories are usually located at the shallow coastal areas in the inner bay. 7 species of true mangrove can be found at the mudflat of Lai Chi Wo. The mangrove there is dominated by *Kandelia candel* (秋茄). Another true mangrove, *Heretiera littoralis* (銀葉樹), grows tall in supratidal region of the bay, supporting gigantic specimens of the climber White-flowered Derris (*Derris trifoliata*).

To live in intertidal region is not easy. Mangrove develops the adaptive features to cope with a highly variable intertidal environment such as high salinity, the fine-grained and unstable substratum and low oxygen level during high tide. For instance, some mangroves develop elaborate support root system in form of root buttresses or stilt roots to anchor the substratum. Some develop aerial roots to assist aeration with the help of pores on their surface and compensate for the relative lack of oxygen in the closely-packed substratum. For reproduction problem under harsh intertidal environment, some kinds of mangroves such as *Kandelia candel* are viviparous to carry their fertilised embryos for a substantial time, so as to increase the survival rate of seedlings in the intertidal regions.

- **Heritiera (銀葉古樹)**

In the coastal region of Lai Chi Wo is the largest and oldest collection of Heritiera trees in Hong Kong. There are altogether hundreds of Heritiera trees in Lai Chi Wo. Coastal Heritiera is very rare in Hong Kong, especially Heritieras of over 15 metres in height. The Heritieras are still alive today and continue to protect the shore from high tides.

Heritiera flowers in April and May, and bears fruit between June and October. Its fruits are light in weight, brown in colour, round and ridged in shape, looking like the head of the popular Japanese figure Ultraman. The ridged edge also mimics a boat stem for seed disposal to farther distance in order to reduce intra-specific competition.

- **White-flowered Derris (白花魚藤)**

Like a giant python, the Derris twines and coils around the mangroves. Some like a swing hanging in the air and some settle on the ground. The sprawling network is so extensive that it is impossible to trace the starting point. In the old days, villagers squashed the vine with a hammer, and mixed the tree juice with water. This mixture was placed outside estuary caves where fish occurred. When the preys came into contact with the dope, they turned numb and became easily caught on the water surface. It is a prohibition to use the derris juice for killing fish as it will damage the marine ecosystem.

The White-flowered Derris of Lai Chi Wo does not make good fish dope or insect repellent because it contains very little Rotenone (魚藤酮). Rotenone can be used environmentally-friendly as pest repellent, much safer than using chemical pesticides. It has always been used on crops and fruit trees. Thanks to this blessing in disguise, it has escaped the axe. Hong Kong is so fortunate to possess such a unique ecological legacy. Therefore, visitors are reminded to save the derris and not to climb and rock them.

### **Mudflat (泥灘)**

A mudflat lies in the transitional zone between the marine and terrestrial environments with muddy substratum. The coastal wetland is submerged and exposed approximately twice daily. In Lai Chi Wo, a mudflat is just outside the Heritiera forest. The vivid mudflat provides a significant feeding site for waterfowls and other intertidal animals at low tide.

## Wetland creatures

Fiddler crabs and mudskippers are interesting creatures living amidst mangroves and mudflat should not be missed. One rule should be strictly observed whilst visiting those lovely creatures – to keep quiet. They are too shy to be easily scared off.

- **Fiddler crabs**

Fiddler crabs usually have a carapace and only males are “equipped” with a large claw. They wave their lethal weapon in a way that looks like praying for the arrival of tide. In fact, their large claws are used for defending their territories and attracting females, whilst their small claws are used for feeding.

- **Mudskippers**

Mudskippers are always mistakenly regarded as amphibians as they can live on land and in water. In fact, they are amphibian-like fish with protruding eyes and sail-like first dorsal fin on its slender body. Like other fish, they breathe through gills and absorb oxygen through their skin and linings of their mouth and throats. That’s why they continue to keep their body and gills wet with pools of water on mudflat at low tide.

It is not difficult to see mudskipper *Periophthalmus modestus* (廣東彈塗魚) in tranquil mangrove or open mudflat. Body is brownish-grey in colour marked with dark bands. The adhesive sucker formed by the fused pelvic fins allows this fish to cling on roots and trunks of mangrove. It can move over mudflats by using its muscular pectoral fins as legs together with the ventral sucker, performing a series of skips or jumps. They feed on crustaceans, insects, and worms while other species eat plankton and algae. At the same time, mudskippers are also a significant source of food for other animals on mudflat such as waterbirds. During courtship, males flag their dorsal fins to woo a mate. The pair shares a territory and a burrow for successful courtship.

## Seagrass bed (海草床)

Seagrass bed is scarcely found in Hong Kong. In the seagrass bed of Lai Chi Wo, both *Halophila ovatis* (圓葉喜鹽草) with fan-shaped leaves and Dwarf Eel Grass (*Zostera japonica*) (矮大葉藻) with filamentous leaves have been found. It has been recorded as the largest seagrass bed in Hong Kong which is around 2 hectares.

Seagrasses belong to the only group of flowering plants that can survive total submergence in seawater. They grow in shallow waters and sheltered coasts or estuaries with soft muddy beds, are home to a variety of marine organisms such as gastropods. Please DO not go near them as they are vulnerable to trampling.

- **Dwarf Eel Grass (*Zostera japonica*) (矮大葉藻)**

Dwarf Eel Grass (*Zostera japonica*) contains vertical leave and stems, Rhizomes prostrate could also be found underground. It spreads its pollen, germinates and produces fruits in water. It was first found in the USA in 1969 and subsequently in Japan and Hong Kong in 1970 and 1978 respectively. Dwarf Eel Grass (*Zostera japonica*) is a species of plants which has been considered as “least concern” in China, though its distribution is widely found all over the world. Dwarf Eel Grass (*Zostera japonica*) can only be found in Tung Chung San Tau and Lai Chi Wo. It is under serious threat by water pollution, infrastructure and reclamation which leads to

the shrinking of the Dwarf Eel Grass (*Zostera japonica*) community in Hong Kong. This urges the concern on the protection of seagrass bed.

**Coral in Lai Chi Wo (荔枝窩的珊瑚)**

More than 50 species of coral are found in Lai Chi Wo. *Platygyra* (扁腦珊瑚) and *Favia* (蜂巢珊瑚) species are commonly found and dominated at the near shore of Lai Chi Wo. Although *Platygyra* species are commonly found in Hong Kong's waters, it is not common all over the world.

## Section 3 – Walking Tour on Ap Chau (鴨洲岸上觀光)

### Ap Chau (鴨洲)

Ap Chau is a small island of 0.03 km<sup>2</sup> close to Sha Tau Kok in the northeastern of Hong Kong and north of Crooked Island, near Yim Tin Harbour in the mainland waters.

This small island is well supplied with facilities, such as a pier, schools established by fishermen etc. During the most prosperous period, a few thousand people were living on the island. The youth moved overseas to find better living whereas others moved out to cities because of better jobs or better schools for the children. Hence, only old women are permanent residence here. During weekends, some residents are back to the island selling dried seafood, such as salty fish, dried spiral shells and dried shrimp to visitors. Nowadays, marine fish culture can be found there.

Ap Chau is named after being resembling a huge duck lying on the sea. Its head faces north, tail faces south and that is how its name comes from. There is a legend that millions of years ago, Ap Chau was really a huge duck which guarded the waters here but it later turned into fossils and it still protecting the area here. On the western side of the island, there are several islets which include “Sai Ap Chau 細鴨洲”, “Ap Lo Chun” (duck’s eggs 鴨螺春). Therefore, it seems that “a family of three” ducks are swimming in the Ap Chau Hoi.

Formed during the Late Cretaceous Period, Ap Chau is mainly reddish brown, thickly bedded breccia with thinly bedded coarse-grained sandstone, cemented with a calcareous and clayey matrix. The calcareous minerals in the rocks are susceptible to weathering and marine erosion, leading to the formation of different geological features such as sea caves, cliffs, arches and wave-cut platforms. In Hong Kong, Ap Chau and neighbouring Crooked Island are two places where breccia is found in large size. Breccia is a type of sedimentary rocks containing angular and sub-angular rock fragments, which are mainly volcanic tuffs, rhyolite and sandstone fragments.

The sediments and their depositional characteristics implied that the rocks accumulated as talus on hillsides, or at the toe of a fault scarp. The reddish colour of the rocks is resulted from the oxidation of iron, indicating that the rocks were formed under semi-arid to arid conditions. Local variations in the layering and structures of the gravels and sands propose that they might have been deposited during periodic floods. The large particle size of the rocks, including gravels and coarse sand, indicates that the sediments were derived from nearby sources.

- **Sea arch & Sea stack**

There are many excellent rock outcrops on Ap Chau, which can be accessed by good footpaths. A well-developed sea arch at the northwestern tip of the island, known as “Duck’s eye” provides excellent rock exposures. Weathering forces of the water break through the cracks in the rocks and enlarge the area of weakness, and gradually create a sea cave. When the sea caves on both sides are burrowed by waves, a sea arch is formed. The sedimentary rocks at the “Duck’s eyes” comprise calcareous breccia/conglomerate, and gravelly coarse-grained sandstone. Although the rock appears to be loose, the material is actually quite well-cemented and strong. After admiring the sculpture of “Duck’s eyes” by powerful wave, “Duck’s neck” is another geological feature. There was originally a crack/fault along the area of “Duck’s neck”. Under the prolonged weathering processes, the crack has been widened and formed the “neck” just behind the “eye”.

- **Wave-cut platform**

The rocks are susceptible to wave erosion. Powerful waves loosen the embedded rock fragments in the breccias, acting as a horizontal saw cutting a notch into the bedrock at sea level and subsequently forming a wave-cut cliff. As erosion continues, the cliff recedes and a terrace is formed. This is the formation process of a wave-cut platform. When the platform rows so large that wave action can no longer erode the bedrock, a beach is formed as sediments are deposited onto it.

### **Yim Tin Port (鹽田港)**

Shenzhen Yim Tin Port is the second largest Cargo Handling Port in China. There are nine berths and already 63 international shipping lines call into the port every year. Tycoon Lee Ka Shing possesses 50% interests the development.

## Section 4 – From Ap Chau to Ma Liu Shui pier (鴨洲至馬料水碼頭船程)

### Sai Kung Peninsula

This is the western part of the Sai Kung Peninsula. Except for a few remote villages, the entire region is a country park named Sai Kung West Country Park. It is the green lung and also the back garden of Hong Kong. There are camping sites, nature and mountain bike trails which are very popular with outdoor enthusiasts. The Hoi Ha Wan rolling hills of Sai Kung West Country Park is Section 3 of the MacLehose Trail, which leads from Pak Tam Chung to Shui Long Wo. This scenic route is challenging but physically demanding.

The west Sai Kung region is home to many amphibians such as Three-striped Grass Frog. Mammals living here are seldom spotted as they are mostly nocturnal species such as Chinese Pangolin, civet leopard cats and boars.

Farming never really developed in this scabrous region. In the old days, local villagers were mostly fishermen. Lime was another means of livelihood. Inshore waters provided an abundant supply of raw material coral skeletons and the old settlements at Sheung Yiu were major production bases of this once booming industry.

### Sharp Peak (蝟蛇尖)

At 468 metres, Sharp Peak towers over the rest of the eastern Sai Kung landscape. Its conical dome and jagged volcanic rocks impart a kind of harsh splendor.

Its Chinese name is Nam She Tsim, meaning python point (as Burmese python is found in Hong Kong).

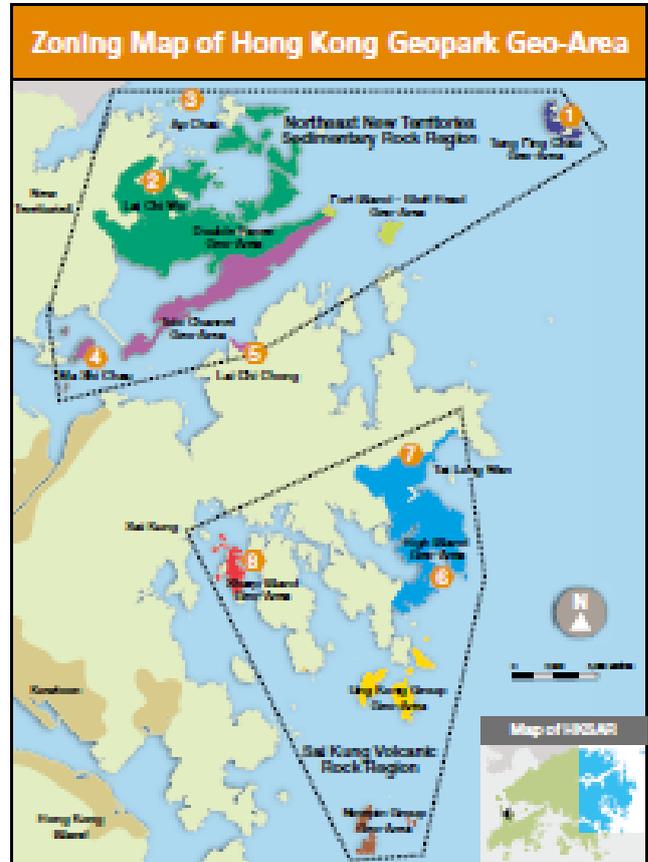
**OTHER REFERENCES**

**Hong Kong Global Geopark of China**

The Hong Kong National Geopark, inaugurated in November 2009, is located in the East and Northeast New Territories and covers an area of 50km<sup>2</sup>. It includes the “Sai Kung Volcanic Rock Region” and “Northeast New Territories Sedimentary Rock Region”, which together feature eight scenic areas showcasing the major exotic landforms in Hong Kong. *(Please refer to the right picture)*

The Global Geoparks Network (GGN), which is supported by the United Nations Educational, Scientific and Cultural Organization (UNESCO), announced its acceptance of Hong Kong Geopark's application for membership of the GGN at the 10<sup>th</sup> European Geoparks Network Conference in Norway on September 17 (Norway time). Subsequent to becoming a member of the GGN, Hong Kong Geopark was officially named "Hong Kong Global Geopark of China".

Source: Hong Kong Geopark, Agriculture, Fisheries & Conservation Department



- |                            |                             |
|----------------------------|-----------------------------|
| 1 Ping Chau Country Trail  | 5 Lai Chi Chong Geo Trail   |
| 2 Lai Chi Wo Nature Trail  | 6 High Island Geo Trail     |
| 3 Ap Chau Geo Trail        | 7 Tai Long Wan Hiking Trail |
| 4 Ma Shi Chau Nature Trail | 8 Sharp Island Geo Trail    |

## Rock Categories & Rock Cycle

There are naturally multitudes of rock categories. Rocks are usually classified into three categories by how they are formed.

Rock Types	Igneous Rocks (火成岩)	Sedimentary Rocks (沉積岩)	Metamorphic Rocks (變質岩)
	Igneous rocks are formed by lava emerging from beneath the Earth's crust, cooled and solidified after being vented onto the Earth's surface or when it is still below the surface. Igneous rocks formed beneath the crust are called intrusive rocks (侵入岩). Those that are formed on the surface called extrusive rocks or volcanic rocks (火山岩).	Sedimentary rocks are rocks formed by "sedimentation". They thinly cover many parts of the Earth's surface. Due to weathering, existing rocks are eroded or precipitated, then settled and compressed into new rocks. During the process there may be peeping of biological remains. Fossils within sedimentary rocks are major resources in studying the evolution of life forms.	Metamorphic rocks are existing rocks that change forms. When rocks encounter tremendous heat and/or pressure, the structure and composition of the rocks change chemically and become new kinds of rocks.
Example	Intrusive rock: - granite (花崗岩) Volcanic rock: - basalt (玄武岩)	- Sandstone (砂岩), - Shale(頁岩) - Limestone(石灰岩)	- Slate (板岩) - Schist (片岩).

There is a relationship between igneous rocks, sedimentary rocks and metamorphic rocks. Over time, change in geological conditions turn any one kind into another. This natural change in rocks is called the rock cycle. Plate tectonics is the driving forces of the rock cycle.

### Rock Cycle

Rocks deep under the Earth's surface melt and become magma. Magma pushes against the openings of the crust towards the surface of the Earth, or is spurted onto the surface by volcanic movement, where it cools and crystallizes as igneous rocks. Existing igneous rocks are exposed to weathering. They are broken down, and are transported and deposited as sediments. The remains of animals and plants may be deposited with the rock debris. These sediments are buried and compacted as sedimentary rocks. Igneous rocks and sedimentary rocks may be deformed and transformed as metamorphic rocks due to heat or pressure. At the same time, metamorphic rocks deep under the Earth's surface melt and become magma. As magma cools and crystallizes it becomes new igneous rocks. Materials of the geo-sphere all go through this circle of rock life.

There is no definite order or rotation in a rock cycle. The Earth's rocks and minerals are decomposed and composed all the time.

Geological Time Scale (地質年代表)

宙 Eon	代 Era	紀 Period	世 Epoch		百萬年 Million years	
顯生宙 Phanerozoic	新生代 Cenozoic	第四紀 Quaternary	Q2, 全新世 Holocene		0.01	
			Q1, 更新世 Pleistocene		1.8	
		第三紀 Tertiary	N, 晚第三紀 Neogene	上新世 Pliocene		5.3
				中新世 Miocene		23.8
			E, 早第三紀 Paleogene	漸新世 Oligocene		33.7
				始新世 Eocene		55
				古新世 Paleocene		65.5
				中生代 Mesozoic	白堊紀 Cretaceous	晚 Ap Chau, Port Island
		早 Double Haven	K1, Early			142
		侏羅紀 Jurassic	晚		J3, Late (Malm)	
	中		J2, Middle (Dogger)			
	早		J1, Early (Lias)		205	
	三疊紀 Triassic	晚	T3, Late			
		中	T2, Middle			
		早	T1, Early (Scythian)		250	
	古生代 Paleozoic	二疊紀 Permian	晚		P2, Late	
			早		P1, Early	292
		石炭紀 Carboniferous	賓夕凡尼亞紀 Pennsylvanian		晚 C2, Late	
			密西西比紀 Mississippian		早 C1, Early	354
		泥盆紀 Devonian	晚 Bluff Head	D3, Late		
			中	D2, Middle		
			早	D1, Early	417	
		志留紀 Silurian	晚	S2, Late		
			早	S1, Early	440	
		奧陶紀 Ordovician	晚	O3, Late		
	中		O2, Middle			
	早		O1, Early	495		
	寒武紀 Cambrian	晚	€3, Late			
		中	€2, Middle			
		早	€1, Early	545		
元古宙 Proterozoic	晚	Late ( 新元古代 Neoproterozoic )				
	中	Middle ( 中元古代 Mesoproterozoic )				
	早	Early ( 古元古代 Paleoproterozoic )		2,500		
太古宙 Archean	晚	Late				
	中	Middle				
	早	Early		3,800		
冥古宙 Hadean	地球的年齡: 46 億年 Earth's age: 4.6 billion years			4,600		

**Geological Units of Hong Kong (香港地質概覽)**

年齡 Age	組 / 群 Formation / Group	岩性 Lithology	Distribution 分佈	相關單位 Related units
Q		鬆散沉積物, 沖積物, 坡積物 Unconsolidated sediments, alluvium, colluvium		
E1	平洲組 Ping Chau Fm.	白雲質粉砂岩, 粉砂岩 Dolomitic siltstone, siltstone	平洲 Ping Chau	
K2	吉澳組 Kat O Fm.	角礫岩 Breccia	吉澳, 流浮山, 鴨洲 Kat O, Lau Fau Shan, Ap Chau	大鵬灣群 Tai Pang Wan Group
	赤洲組 Port Island Fm.	赤紅色砂岩, 礫岩 Reddish sandstone, conglomerate	赤洲, 大鵬灣 Port Island, Mirs Bay	
K1	八仙嶺組 Pat Sin Leng Fm.	赤紅色粉砂岩 Reddish siltstone	八仙嶺, 新娘潭 Pat Sin Leng, Bride's Pool	
	滘西洲群 Kau Sai Chau Volcanic Group	細火山灰, 流紋岩, 熔結凝灰岩 Fine ash, rhyolite, welded tuff	清水灣, 滘西洲, 萬宜水庫, 果洲群島 Clearwater Bay, Kau Sai Chau, High Island Reservoir, Ninepin Is.	糧船灣組, 清水灣組 High Island Fm., Clear Water Bay Fm.
	淺水灣群 Repulse Bay Volcanic Group	條紋斑狀凝灰岩, 細火山灰凝灰岩, 流紋岩 Eutaxitic tuff, fine ash tuff, rhyolite	大嶼山, 嶂上, 西貢, 香港島 Lantau Is., Cheung Sheung, Sai Kung, Hong Kong Is.	孟公屋組, 大灘海峽組, 娥媚洲組, 鴨脷洲組 Mang Kung Uk Fm., Long Harbour Fm., Ngo Mei Chau Fm., Ap Lei Chau Fm.
J3	大嶼山群 Lantau Volcanic Group	玻屑凝灰岩, 火山碎屑沉積物 Vitric tuff, volcaniclastic sediments	大嶼山, 荔枝莊 Lantau Is., Lai Chi Chong	荔枝莊組 Lai Chi Chong Fm.
J2	荃灣群 Tsuen Wan Volcanic Group	英安質凝灰岩, 火山灰凝灰岩 Dacitic tuff, ash tuff	元朗, 上水, 沙田, 大埔 Yuen Long, Sheung Shui, Shatin, Tai Po	西流江組, 大帽山組, 城門組, 鹽田仔組 Sai Lau Kong Fm., Tai Mo Shan Fm., Shing Mun Fm., Yim Tin Tsai Fm.
	屯門組 Tuen Mun Fm.	安山岩, 凝灰岩, 火山角礫岩 Andesites, tuff, volcanic breccia	屯門, 天水圍 Tuen Mun, Tin Shui Wai	
	大澳組 Tai O Fm.	灰色粉砂岩, 含石墨砂岩 Greyish siltstone, graphitic sandstone	大澳 Tai O	
J1	赤門海峽組 Tolo Channel Fm.	粉砂岩, 砂岩, 泥岩 Siltstone, sandstone, mudstone	鳳凰笏, 泥涌, 深涌 Fung Wong Wat, Nai Chung, Sham Chung	
P	大埔海組 Tolo Harbour Fm.	黑色粉砂岩, 砂岩, 泥岩 Black siltstone, sandstone, mudstone	馬屎洲, 中文大學 Ma Shi Chau, Chinese University	丫洲組, 東涌組 Center Island Fm., Tung Chung Fm.
C1	落馬洲組 Lok Ma Chau Fm.	石英岩, 變質礫岩, 千枚岩 Quartzite, metaconglomerate, phyllite	羅湖, 馬屎洲 Lo Wu, Lok Ma Chau	新田群 San Tin Group
	元朗組 Yuen Long Fm.	大理岩, 白雲岩 Marble, dolomite	馬鞍山, 元朗 Ma On Shan, Yuen Long	
D	黃竹角咀組 Bluff Head Fm.	粉砂岩, 石英質礫岩, 赤紅色砂岩 Siltstone, quartz conglomerate, red sandstone	馬鞍山, 黃竹角咀, 赤門海峽一帶 Ma On Shan, Bluff Head, Tolo Harbour Is.	

年齡 Age (百萬年 Million years)	侵入岩 Intrusive Rocks	岩性 Lithology	分佈 Distribution
140	獅子山岩套 Lion Rock Suite	細粒至中粒花崗岩和石英二長岩 Medium and fine-grained granite, quartz monzonite	九龍, 香港島, 蒲台島 Kowloon, Hong Kong Is., Po Toi Is.
144-142	長洲岩套 Cheung Chau Suite	石英二長岩, 流紋英安質斑狀岩 脈 Quartz monzonite, rhyodacite porphyry dykes	長洲, 大嶼山 Cheung Chau, Lantau Is.
148-146	葵涌岩套 Kwai Chung Suite	粗粒花崗岩, 流紋岩脈 Coarse-grained granite, rhyolite dykes	大嶼山, 沙田, 南丫島 Lantau Is., Shatin, Lamma Is.
165-160	南丫島岩套 Lamma Suite	細粒至中粒二長花崗岩及花崗閃 長岩 Medium and fine-grained monzogranite, granodiorite	大欖, 青山, 大嶼山, 大帽 山, 南丫島, 索罟群島 Tai Lam, Tsing Shan, Lantau Is., Tai Mo Shan, Lamma Is., Soko Is.

Source: Geological Society of Hong Kong

## **Code of visiting Geosites in Hong Kong**

- Never go on a rock or landform appreciation trip alone.
- Never go on a rock or landform appreciation trip in adverse weather.
- Plan a safe trip with reference to the tidal information posted on the Hong Kong Observatory's website. Be aware that some coastal areas may not be accessible at all times.
- Plan a route with a proper trail that ALL members of your group may reasonably handle.
- Some islands and coastal areas may be difficult to access and are only suitable for boat trips. Avoid visiting them when strong easterly winds prevail.
- Remain alert to changes in the surrounding environment and any potential hazards, such as rapids, cliffs and steep slopes. Exercise extra caution when rock surfaces are wet.
- Do not climb the rock columns or trample on severely weathered or eroded surfaces. Watch out for shifting or slippery rocks.
- Wear suitable hiking shoes, hats and clothes. Also take gloves, first-aid kits and weather-proof clothes with you.
- Mobile phone coverage may vary from place to place. Leave details of your route and expected return time with someone, for raising the alarm if necessary.
- Use only boat operators who comply with all the safety requirements and have life jackets for all passengers.
- Do not take away any rock, fossil, mineral or silt. It is an offence to dig up, damage or deface any rocks in Hong Kong.