

# A NEW GEOGRAPHY OF HONG KONG

上冊 • Vol. I

第二版 2nd Edition

# 新 香 港 地 理



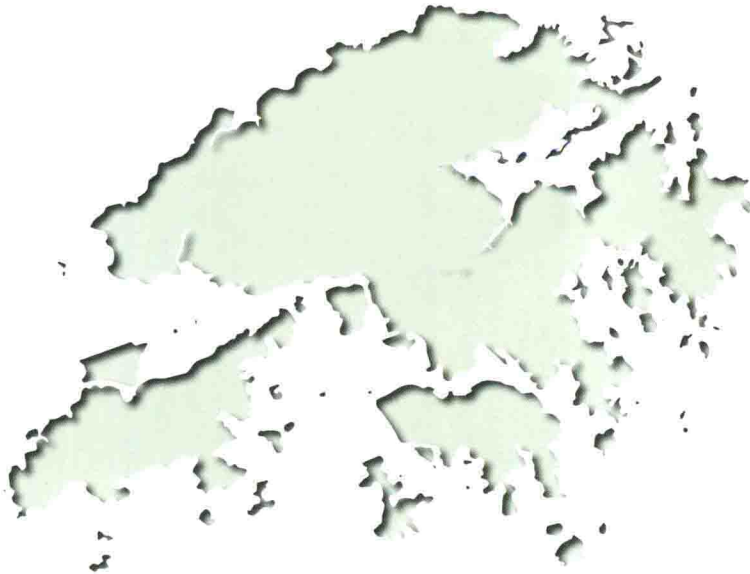
HONG KONG  
GEOPARK  
香港地質公園

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**新  
香  
港  
地  
理**



# A NEW GEOGRAPHY OF HONG KONG

上冊 • Vol. I

# 新 香 港 地 理

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## 出版

郊野公園之友會

天地圖書有限公司  
香港灣仔皇后大道東 109-115 號  
智群商業中心 13 字樓

## PUBLISHER

Friends of the Country Parks  
<http://www.focp.org.hk>  
Cosmos Books Ltd.  
13/F, Greatmany Centre, 109-115,  
Queen's Road E., Wanchai, Hong Kong

## 國際書號

978-988-211-389-3

## ISBN

## 設計及承印

易設計  
第一美術出版有限公司

## DESIGN & PRINTING

in-Design  
Daiichi Publishers Co Ltd.

## 版次

2010 年 7 月 第 1 版  
2011 年 2 月 第 2 版

## EDITION

1<sup>st</sup> Edition July, 2010  
2<sup>nd</sup> Edition February, 2011

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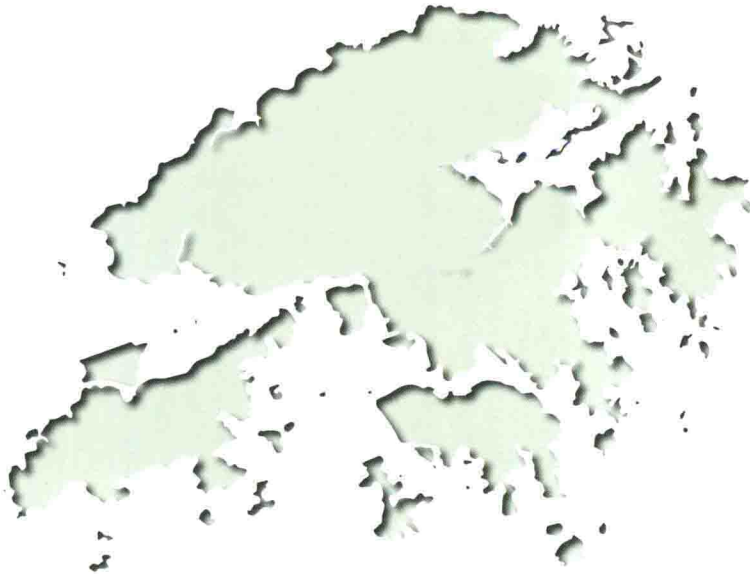
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# 前言

在不少人心目中，地理也許只是一門脫離現實世界的學術科目，但事實上，地理知識卻與我們的日常生活息息相關——天上風雲變色，地上山川遍布，動植物在其中生生不息；同時亦包括人類聚落的形態與運作模式，以及當中的運輸和交往聯繫。大自然創造了環境，人類則要學習如何在當中生存，或在險惡境況中面對災害，或在豐盛大地中擷取資源，或在其中開拓發展，展開生活，建立歷史；最重要的是，在人和自然的互動中，找到平衡的可持續關係。

如何理解和掌握人與環境的關係，正好就是地理學者研究的重點課題。一群學者和大學教授在上世紀80年代根據香港當時的環境和地理理論編寫 *A Geography of Hong Kong*，是現存少數較詳盡和全面的香港地理環境論著。然而，20多年來，香港的社會、經濟及生活環境出現巨大變化，人口由500多萬增至700多萬，經濟由工業轉型為金融服務業主導，加上環境意識提升及保育工作的推展，不論是自然及人文地理環境均產生異於往昔的重要變化。

期間，雖然也有不少詳細探討這些轉變的期刊文章、書籍和專題著作面世，但主要屬於純理論性質，而且散見於多數人較難觸及的純學術典籍。因此，利用最新資料全面介紹香港地理議題的刊物，成了一眾本地學者的共同心願。

現時，新高中學制強調通識教育，讓學生透過廣泛閱讀和專題學習，建立獨立思考能力。《新香港地理》正好可有效配合教學需要，首先從香港的天氣、地貌和生態環境等錯綜複雜的自然元素開始，進而述及人類在多變的環境中如何應付自然災害、如何在多樣化的環境中保護大自然，以及享受自然界帶來的休閒生活；同時善用環境資源，創造生存空間和經濟機遇，讓每個人在其中找到安身立命之所，從而了解人與大自然之間紛繁的相互關係。最後亦介紹現代地理研究的最新應用技術——地理信息系統，藉此分析和加強認識我們所居之地。《新香港地理》以中英雙語編寫，配合簡明易懂的內容和寫作方式，不僅可作為教師和學生的學習材料，也能為一般讀者帶來於大地有關的整體和有趣的知識。透過本書，讀者將重新發現地理知識並不沉悶，而且是引發求知動力、理解生存環境，以及達至可持續與和諧發展的鑰匙。

在此，我們衷心感謝所有編寫本書的作者在百忙中抽空撰寫文章，以及各位參與製作的工作人員及好友。沒有他們的投入和貢獻，本書不可能在短短數月間完成。

# Foreword

Quite a few people consider geography to be nothing more than an academic subject that could be divorced from the real world. On the contrary, geographic knowledge is intimately related to our daily life, for instance, changes in weather, the layout of mountains and rivers, the never-ending cycle of plant and animal lives, the form and operation of human settlements, and the transport and communication linkages amongst them. Human beings must learn to survive in and benefit from nature in the face of natural disasters, extracting resources, or developing the earth to leave a mark in history. In doing so, it has become critically important to strike a sustainable balance in the interactions between human and nature.

Understanding and mastering the relationship between human and nature constitute the key themes of geographical inquiries. A Geography of Hong Kong, compiled by a group of scholars and university professors in the 1980s, was one of the few books that provided detailed and comprehensive information about the geographical environment of, and geographic theories related to, Hong Kong. After 20-odd years, however, Hong Kong has experienced drastic changes in its social, economic and living environment. Its population has grown from over five million to seven million, and the financial and service sector has replaced manufacturing as the economic mainstay. Together with the rise in environmental consciousness and promotion of resource conservation, both the natural and human environments have undergone significant changes that depart from the past mode.

Many journal articles, books and monographs examining such transformations have been published in the interim. However, they are mainly academic in nature and are scattered in a large number of learned sources that are relatively less accessible to most people. It has become a common wish of local scholars to write an update of the geography of Hong Kong, with a view to evaluating the state-of-art on two fronts, namely the present patterns and processes in human-land interactions, and their interpretation in the light of the latest geographical concepts.

At present, the New Senior Secondary (NSS) system assiduously promotes general education to cultivate students' capacity for independent thinking through extensive reading and study of topical issues. *A New Geography of Hong Kong* could effectively fill this pedagogic need. It first introduces the intricacies of our natural milieu, including weather, landform and ecological endowment. It then takes readers to the diverse interplays between nature and humans by exploring how humans should live with natural disasters and protect nature amid the changeable and often vulnerable environment, enjoy leisure activities in the pleasant ambience of nature, and make good use of the earth's resources to create living spaces and economic opportunities, so that we can live in harmony with nature and fellow humans. In the final section, the book presents the application of a modern geographical research method, GIS, to enhance analysis and understanding of our own abode. With easy-to-understand contents, a simple writing style and bilingual text, *A New Geography of Hong Kong* not only provides learning materials for teachers and students, but also presents an interesting and integrating body of knowledge about our own land for the general public. It is hoped that readers will find that geographical knowledge is by no means boring. Rather, it could be enlivened to whet our enthusiasm to learn, and facilitate our collective attempt to live and develop in the sustainable mode.

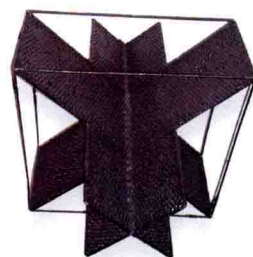
We would like to extend our sincere gratitude to the authors who devoted their valuable time, scholarship and heart to this book, and to all those involved in its production. Without their kind efforts and dedication, it would not have been possible to accomplish this task in a timely and efficacious manner.





# 天氣與氣候

## Weather and Climate



林超英

香港特別行政區

香港天文台

於二零零九年十月退休

**Lam Chiu Ying**

Hong Kong Observatory,

HKSAR Government

Retired in October 2009

## 引言

香港位於北緯 $22^{\circ}10'$ 和 $22^{\circ}35'$ 之間，剛好就在北回歸線南面，地理上應屬於熱帶範圍。然而，在天氣和氣候上，這裏的溫度及濕度，又跟「熱帶」存在一段距離。另一方面，香港與阿拉伯及撒哈拉沙漠等地處於相同緯度，受從亞熱帶高壓脊下沉的乾燥影響；假如沒有其他種種因素的干擾，本港可能會同樣乾旱。

香港幸運地沒淪為沙漠，是因為其位於歐亞大陸東南角，鄰近南中國海和太平洋的沿海位置。廣闊的內陸和毗連的海洋溫度差異懸殊，形成了著名的季候風系統，使這世界一隅的亞熱帶高壓脊作用受到干擾。每逢冬季，乾冷空氣由寒冷的大陸流回溫暖的海洋，為香港帶來異於相近緯度（例如夏威夷）冬季狀況。每逢夏季，氣流以相反方向流動，香港因而受到經過漫長海路而至的空氣影響，其中所挾帶的水分帶來大量降雨。此外，熱帶氣旋亦會帶來傾盆大雨，一般在登陸時在沿岸地帶落下大部分雨水。

由此可見，香港的天氣和氣候主要受制於季候風，再因海洋的影響而得以緩和，多山的地勢則使境內的地區性差異更形複雜。



香港在北回歸線南面，歸入熱帶範圍  
Hong Kong is located on the south of the Tropic of Cancer, within the tropical zone



## Introduction

Hong Kong is located between  $22^{\circ}10'$  and  $22^{\circ}35'$  North in terms of latitude, just south of the Tropic of Cancer. It is, therefore, formally within the tropical zone. However, in terms of weather and climate, it is far from being "tropical" in the simple sense of being warm and humid. On the other hand, Hong Kong is situated in the same latitude belt as the Arabian and Sahara Deserts, where the subtropical ridge of high pressure brings constantly subsiding air from the dry atmosphere aloft. Hong Kong could have been equally dry if not for the existence of other factors.

Hong Kong's good luck lies in its location on the south-eastern corner of the Eurasian continent and on its coastal position, with the South China Sea and the Pacific as its close neighbours.

The strong temperature contrast

between the interior of the vast continent and the adjacent ocean generates the well-known monsoon system, which disrupts the action of the subtropical ridge in our part of the world. In winter, cold dry air moves from the cold continent to the sea, bringing to Hong Kong wintry conditions which are not experienced in places of similar latitude, such as Hawaii. In summer, the airflow reverses direction and Hong Kong comes under the influence of air with a long sea track. The moisture it brings gives Hong Kong ample rainfall. This is further supplemented by torrential rain brought by tropical cyclones, which often dump most of the rain they carry near the coast as they make landfall.

The weather and climate of Hong Kong are thus, in essence, controlled by the monsoons and moderated by maritime influences. Its hilly terrain adds further complications in terms of spatial variations within Hong Kong itself.



## 天氣形勢

### 冬季

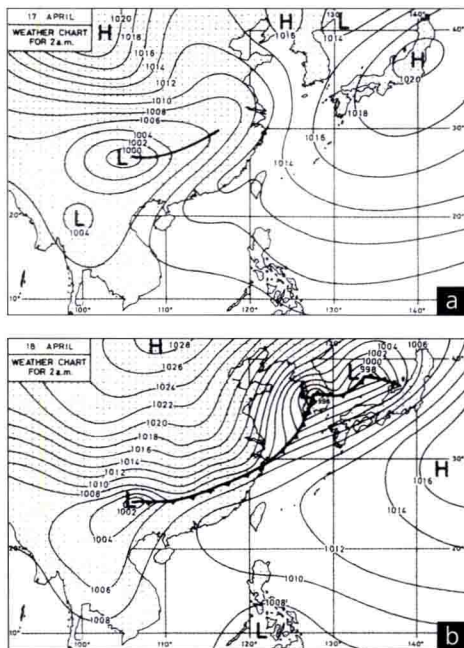
每年之始，香港總會受到冬季東北季候風影響，此股季候風在期間帶來由西伯利亞和華北大陸反氣旋吹出的冷空氣。不過，大陸上的東北季候風並非穩定不變，其強度會出現升降，周期平均約為一星期，反映出西伯利亞反氣旋的脈動。大陸冷空氣伸展至最南位置的日子通常在1月底至2月初，因此這也是中國大部分地方（包括香港）一年中最寒冷的時間。雖然中國新年的日期以農曆決定，但也總是落在這段日子之中。這實際上是人們慶祝回暖，標誌著春回大地的節日；中國農曆新年的時間，正好反映出民眾就該區域最冷氣候所具備的傳統知識。

### 春季

春季是香港的過渡季節，中國大陸冷空氣的脈動並不如冬季那般強勁和持久，冷空氣偶爾也會因為受到南中國海或太平洋和暖空氣所影響而出現位置移動。圖1(a)顯示海洋空氣已侵佔整個中國南部的情况。閱讀這些天氣圖時須留意，風在海面的吹向往往與等壓綫平行，低氣壓在左邊；陸上的風向則與等壓綫構成一定角度，由高氣壓的一邊吹向低氣壓，假如大陸性反氣旋在中國大陸迅速向南伸展，該角度可能在某些地方達至90度之多。

圖1： 1991年4月17至22日的天氣圖，顯示典型的春季天氣循環，圖(e)的虛綫代表中國東南部附近一道狹窄的高壓脊。Lam et al. (1994)

Figure 1: Weather charts, 17-22 April 1991, showing a typical cycle of weather situations in spring. The dashed line in (e) marks the narrow ridge of high pressure near the coast of southeastern China. Lam et al., 1994





# Weather patterns

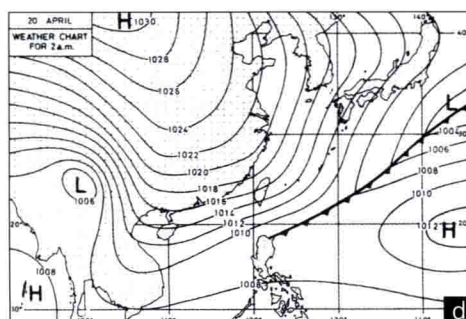
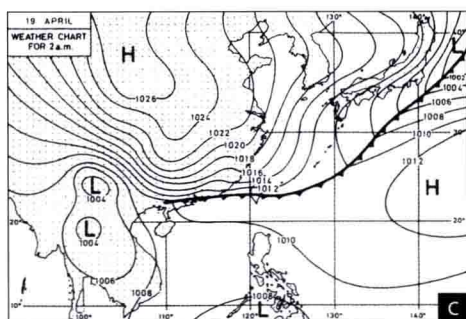
## Winter

The beginning of the calendar year typically sees Hong Kong coming under the influence of the northeast winter monsoon, bringing cold air spreading out from the continental anticyclone located in Siberia and northern China. The northeast monsoon over the continent, however, is not a static phenomenon. Its strength rises and falls in cycles, each lasting for a few days, reflecting pulsations in the Siberian anticyclone. The maximum southern extent of cold air from the continent typically occurs around late January and early February. It is, thus, the coldest time of the year in most parts of China, including Hong Kong. Chinese New Year always occurs around this time, in spite of the fact that the date is determined by the lunar calendar. It is, in essence, a celebration of the beginning of warming, marking the arrival of spring. The timing of Chinese New year is a reflection of the traditional wisdom about the climatology of maximum coldness in the region.

## Spring

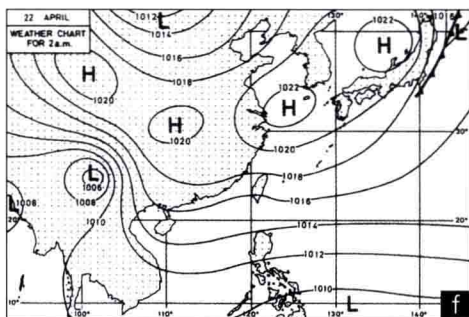
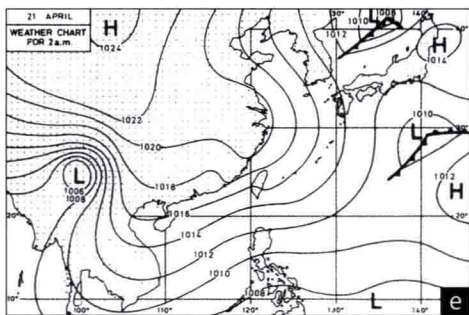
Spring is the transition season in Hong Kong. The pulses of cool air coming from the Chinese mainland are not as strong and persistent as in winter. Cool air is occasionally displaced by warmer air coming in from the

South China Sea or elsewhere in the Pacific Ocean. Figure 1(a) illustrates a situation in which maritime air has invaded the whole of southern China. In reading these maps, bear in mind that over the sea, winds tend to blow parallel to the isobars, with low pressure on the left-hand side. On land, winds blow at an angle to the isobars, from the high pressure side to the low pressure side. The angle can be as much as 90 degrees in places where the continental anticyclone spreads southward rapidly over China's mainland.





在春季期間，冷空氣仍然會在西伯利亞及華北地區出現周期性氣壓上升，之後以脈動形式到臨香港。在這些情況下，由於華北氣壓上升及向南伸展，氣壓脈動會把冷空氣向南推移。在天氣圖中，可見推動冷空氣的情況會以等壓綫緊密排列的區帶呈現，一道冷峰有時會在南側出現（圖1(b-c)）。假如推動力強度足以使冷空氣越過粵北南嶺山脈的話，冷空氣便可到達香港，帶來一股來自北方的氣流（圖1(d)）。由於其中第一股到達香港的空氣在被氣壓脈動帶動之前通常已在中國大陸受日曬多天而變暖，因此本港的溫度大多會延遲一天左右才會明顯下降。



乾冷大陸空氣和濕暖海洋空氣接觸帶一般會形成雲，因此，每當冷空氣到來之際，通常都會轉為多雲有雨的天氣。若然濕暖空氣已存在一段長時間，則甚至可能出現雷暴。不過，視乎上層空氣的環流形態而定，天氣亦可能頗快轉晴。

在氣壓分布形態的下一演變階段中，高壓區向東伸展入太平洋（圖1(e)），本地逐漸轉吹東風。留意等壓綫圖的一大特徵：位於台灣對岸福建沿海的狹窄高壓脊。這表示冷空氣在南嶺東端的武夷山尋找出路，並向下湧入台灣海峽。這個小型高壓脊特徵毫不起眼，事實上卻常與台灣海峽的烈風和廣東東部離岸水域的強烈東風帶有關。這類強風的範圍可以向西延伸，遠及香港，引致「東風增強」。

隨著推動力減弱，香港的東風亦開始緩和。然而，東海上方的氣壓持續偏高，因而在呂宋海峽保持一股增強的向東氣流。相對於圖1(b)而言，圖1(f)中台灣北部與呂宋南部大量的等壓綫正好顯示出較高風速。

東風會於周期接近終結時進而轉向為東南風，華南再次被濕暖海洋空氣影響。及至春季之末，東南風更會被南中國海的西南風取代。

In spring, cool air can still arrive in Hong Kong in pulses, following the periodic rises in pressure in Siberia and northern China. In such situations, as the pressure over northern China rises and spreads to the south, the pressure pulse pushes cold air southwards. On weather charts, the push of cold air appears as a zone of tightly packed isobars, sometimes with a cold front marking its southern flank (Figure 1(b-c)). If the push is strong enough to cause the cold air to climb over the Nanling mountain range in northern Guangdong, then cold air can arrive in Hong Kong, bringing about a “northerly surge” (Figure 1(d)). Because the first batch of air reaching Hong Kong in a northerly surge has often been warmed up by the sun for several days on the China’s mainland before being caught up by the pressure pulse, significant temperature falls in Hong Kong often occur, with a delay of a day or so.

Clouds typically form along the belt where cool, dry, continental air meets warm moist, maritime air. Thus, it often turns cloudy and rainy with the arrival of cold air. There might even be thunder if warm, moist air has been in place for a long time. However, the weather can also clear up fairly quickly, depending on upper-air circulation patterns.

The next stage in the evolution of the pressure pattern is the eastward extension of the high pressure area into the Pacific (Figure 1(e)) and the gradual veering of local winds into easterlies. Note a special feature in the isobaric chart – the narrow ridge of high pressure along the Fujian coast opposite Taiwan Island. This represents cold air finding its way round the Wuyi Mountains at the eastern end of Nanling and surging down the Taiwan Strait. While superficially an innocuous feature, it is often associated with gales in the Taiwan Strait and a belt of strong easterly winds over the offshore waters of eastern Guangdong. Such strong winds can extend sufficiently far enough to the west to reach Hong Kong, giving rise to an “easterly surge”.

As the push subsides, the easterly winds in Hong Kong begin to moderate. However, air pressure remains relatively high over the East China Sea and this maintains an enhanced easterly air flow over the Luzon Strait. The larger number of isobars between northern Taiwan and southern Luzon in Figure 1(f) compared with that in Figure 1(b) is an indication of higher wind speed in the former case.

Towards the end of the cycle, the easterly winds veer further into south-easterly winds, and southern China comes under the influence of warm, moist maritime air again. Towards the end of spring, the south-easterly winds are sometimes further displaced by south-westerlies coming in from the South China Sea.



有時候，氣壓脈動並不強烈，冷空氣被南嶺山脈阻擋；在這情況下，香港的冷空氣並非來自北方，而是由東而至港。圖2展示有關例子，南嶺以北的冷空氣以密集等壓綫帶呈現，其南面界限有時會出現一道低壓槽（又或是準靜止鋒）。

在整個春季期間，氣壓脈動和寒潮的循環每數天重複一次；隨後，脈動愈來愈弱。北方冷空氣與南方濕暖空氣在華南沿岸附近相遇，構成一道微弱「鋒」的情況逐漸增加（圖3(a)），這條分隔綫兩邊的溫度有時只有微小差異，以至那些在中緯度工作的氣象學家可能無法辨識。在某些情況下，這看來更像一道低壓槽。

圖2： 1987年5月7至10日的天氣圖，顯示一股由東而至的氣流發展，但之前並沒有來自北方的氣流。(b)和(c)的虛綫代表中國東南沿岸附近一道狹窄的高壓脊。Lam et al., 1994

Figure 2: Weather charts, 7-10 May 1987, showing the development of an easterly surge without being preceded by a northerly surge. The dashed line in (b) and (c) marks the narrow ridge of high pressure near the coast of southeastern China. Lam et al., 1994

