

## 華南氣候變化和珠江三角洲城市化的相互關係

### Relationship between climate change in South China and urbanization in the Pearl River Delta

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#### 摘要

#### Abstract

全球氣候變化和城市化將對地球自然系統產生顯著影響。有關此種影響的研究對於採取有效的相應減災措施至關重要。自從二十世紀八十年代初以來，華南地區的廣東省，特別是珠江三角洲地區經歷了快速的經濟發展和大規模的城市化變遷；由此引起的環境和自然資源的變化已在某種程度上對保持該區域的社會經濟可持續發展產生了影響。然而，有關全球變暖和因人類活動（包括城市化發展）而引起的華南地區氣候變化的研究和探討，還不能滿足為保持該區域可持續發展而需要提高理解由氣候變化和城市化所引起的環境和自然資源變化。本研究旨在提高對華南地區氣候變化和珠江三角洲地區城市化發展之間關係的認識和理解。

本研究揭示在華南地區，最高溫度和最低溫度從 1960 年到 2005 年增加非常顯著。此階段地區性溫度增加幅度與同期全球變暖幅度大致相同；然而從 1984 年到 2005 年之間，華南地區區域性溫度增加差不多是全球溫度增加值的兩倍。地區平均降雨呈現上升趨勢（但上升變化從統計學角度考慮則不顯著）；同時地區平均相對濕度顯著下降。對於城市化，本研究發現在珠江三角洲地區城市化主要對日最低溫度、降雨和大氣相對濕度有影響，而對於日最高溫度則沒有影響。從 1984 年後，珠江三角洲城市化引起當地的日最低溫度和降雨增加，而大氣相對濕度減少。

Global climate change and urbanization may result in profound impacts on the Earth's natural system. The study of understanding such impacts on climate is urgent and vital for taking suitable measures in mitigating potential related damages. In South China, Guangdong Province, especially the Pearl River Delta Region (PRD), has been experiencing fast economic development and large-scale urbanization since the early 1980s. However, investigation of the effects of global warming and the anthropogenic influence (including urbanization) on regional climate in South China is inadequate to meet the understanding required for developing the regional socio-economic sustainability from an environmental and natural resource perspective. This study focuses on enhancing understanding of the relationship between regional climate change in South China and local urbanization in the Pearl River Delta.

The study revealed that in South China daily maximum and minimum temperatures have increased significantly in the period of 1960 to 2005. The rate of increase for the period was similar to that of global warming for the same period. However, the rate of increase for the period of 1984 to 2005 in South China is nearly double the global increase for the same period. Averaging the whole region, the precipitation is on a rising trend but not significant. The trend of the relative humidity over the whole region is decreasing. Regarding the urbanization effects, this study showed that urbanization of the PRD has significantly affected the daily minimum temperature and relative humidity.