

# 利用衛星地表溫度研究都市熱島效應

## Study on Urban Heat Island Effects using Satellite-Derived Land Surface Temperature

盧光輝<sup>1</sup> (Lu Q.-H.) 李明安<sup>1,2</sup> (Lee M.-A.) 吳俊宏<sup>1</sup> (Wu J.-H.) 楊智傑<sup>3</sup> (Young C.-C.)

<sup>1</sup>國立臺灣海洋大學環境生物與漁業科學學系

<sup>2</sup>國立臺灣海洋大學海洋中心

<sup>3</sup>國立臺灣海洋大學海洋環境資訊系

<sup>1</sup>Department of Environmental Biology and Fishery Science, National Taiwan Ocean University

<sup>2</sup>Center of Excellence for Ocean, National Taiwan Ocean University

<sup>3</sup>Department of Marine Environment Informatics, National Taiwan Ocean University

### 摘 要

都市熱島(UHI)是由於都市化而導致城市或大都會地區大氣和地表溫度高於週邊郊區之現象。利用日本向日葵衛星地表溫度資料對都市熱島效應進行研究，以準確評估台灣主要城市的都市熱島分佈，進而提供整體應對氣候變化之計劃，以及找尋降低都市熱島對都市人類生活影響的解決方案。衛星地表溫度、地形高度以及雲分佈資料由中央氣象署提供，時間間隔為20分鐘，空間解析度為2公里。資料分析顯示地表溫度與地形高度呈負相關，高溫區集中在低窪或地勢平坦的地區，且主要集中在交通和建築密集的城市地區。都市熱島分佈分析顯示，台北市熱島集中在西南區。由於陽明山的存在，台北市的北區和東北區氣溫明顯低於其他地區。

關鍵字：都市熱島、地表溫度、向日葵衛星

### Abstract

The urban heat island (UHI) is the phenomenon of higher atmospheric and surface temperatures occurring in urban or metropolitan areas than in the surrounding rural areas due to urbanization. A study on the effects of urban heat islands using Himawari satellite surface temperature data was initiated to accurately assess the distribution of UHIs in major cities in Taiwan, thereby providing plans to adapt to climate change in general, as well as solutions to minimize the impact of UHI on human life in the towns in particular. Data on surface temperature, terrain elevation, as well as cloud distribution, are provided by the Central Weather Authority (CWA), the time step is 20 minutes, resolution of 2km. Data analysis shows a negative correlation between surface temperature and terrain elevation. The high-temperature zones are concentrated in low, flat terrain areas and mainly in crowded urban areas with dense traffic and construction. UHI distribution analysis shows that the concentration of heat islands in Taipei City is in the southwest of the city. Due to the presence of Yangmingshan, the temperature in the north and northeast of the city is significantly lower than in other areas.

Key words: Urban Heat Island, Land Surface Temperature; Himawari Satellite