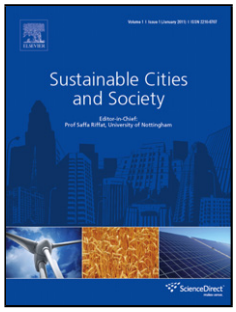

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PII: S2210-6707(16)30567-4
DOI: http://dx.doi.org/doi:10.1016/j.scs.2017.01.017
Reference: SCS 576

To appear in:

Received date: 2-11-2016
Revised date: 16-1-2017
Accepted date: 19-1-2017

Please cite this article as: Xu, D., and Chen, R.,Comparison of urban heat island and urban reflection in Nanjing City of China, *Sustainable Cities and Society* (2017), http://dx.doi.org/10.1016/j.scs.2017.01.017

Comparison of urban heat island and urban reflection in Nanjing City of China

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Highlights:

1. We illustrated the linear relation between land surface temperature and urban reflectance.
2. The land surface temperature mainly has negative relation with vegetation surface at the rate of Y= -X and Y= -2.5X.
3. There is mainly positive relation between land surface temperature and substrate surface at the rate as Y= X and Y= 2.5X.
4. The land surface temperature has mainly negative relation with dark surface at the rate of Y= -3X.
5. Some abnormal phenomenon is caused by the mixed pixels and moisture soil.
6. The intensity of land surface temperature also influences the population number and precipitation as the equator of Y=4.2503X+590.7 and y=2.3811x+14.986.

Abstract: The spectral properties and surface temperature of land cover influences the urban environmental conditions. This research takes the Nanjing city in Jiangsu Province of China as a case. The urban reflectance is grouped into three types (substrate, vegetation and water) by linear spectral mixture. The substrate surface in Nanjing is expanding from the central urban area to the suburbs during, but the intensity of substrate surface in the central urban has weakened since 2007. The land surface temperature mainly has negative relation with vegetation surface at the rate of Y= -X and Y= -2.5X. There is mainly positive relation between land surface temperature and substrate surface at the rate as Y= X and Y= 2.5X. The land surface temperature has mainly negative relation with dark surface at the rate of Y= -3X. Some abnormal phenomenon is caused by the mixed pixels and moisture soil. At the same time, the intensity of land surface temperature also influences the population number and precipitation as the equator of Y=4.2503X+590.7 and y=2.3811x+14.986. The linear quantitative relation between land surface temperature and vegetation, substrate and dark surface are potential to apply for ecologic, hydrologic and climate models and for a reasonable land planning.

Keywords: Land surface temperature; Urban reflection; Linear spectral unmixing; Nanjing;

1. Introduction

There are two important problems related to urban heat island effect: (1) How much temperature increase is caused by urban heat island? (2) How the ecosystems respond to global warming? At present, the majority of developing counties in the world are experiencing rapid urbanization and industrialization. Over the past 20 years, rapid urbanization has led to dramatic