

## **The dynamic of urban thermodynamic climate over Beijing region with multi-temporal scales**

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In last five decades, the global climate is undergoing a distinctive change mainly characteristic of warming. Especially, with the development of world-wide urbanization, urban heat island effects are more and more distinct in many major cities due to the anthropogenic heating emission, simultaneous removal of natural land cover and introduction of urban materials. Beijing is the capital and one of largest cities situated in north of China (39°56'N, 116°20'E). It has an area of 16808 sq km and a population of about 15 000 000. It is well recognized that the UHI in Beijing urban areas has tended to increase and intensification with accelerated urbanization since the 1980s. The study reports a research aiming to detect the temporal dynamic of urban heat island (UHI) phenomena in Beijing, China. The annual average temperature and wind speed over Beijing meteorological stations data from 1960-2003, and hourly temperature data from Beijing urban and suburb multi-sites in 2005 were used to analyze the thermodynamic climate changes and diurnal variations of temperature differences in Beijing. The result shows that annual average temperature appears increase trend in Beijing urban and suburb areas for past 50 years, increasing range of annual average temperature is 4.6°C/10a for urban region and 2.1°C/10a for suburb area, separately. Temperature difference from the urban and the suburbs (i.e, urban heat island: UHI) also shows an increasing trend with a 0.24°C/10a increasing speed. There is a negative correlation between the UHI and synchronous wind speed in Beijing region ( $R = -0.6118$ ), and declining wind speed led to UHI intensity increase. The obviously strong daily UHI occurs in nighttime in Beijing region, whereas a weak daily UHI appears in the noon. Seasonally, the daily UHI effect is obvious in the winter and autumn seasons compared with the spring season. The influence of anthropogenic factors on the UHI in Beijing was analyzed in this paper. \*This study was supported by the Basic Research Key Project (Grant No.2010CB951302).