

Effects of China's Urban Form on Urban Carbon Emission

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Abstract : Urbanization has reshaped physical environment, energy consumption and carbon emission of the urban area. China is a typical developing country under a rapid urbanization process and is the world largest carbon emission country. This study aims to explore the correlation between urban form and carbon emission caused by urban energy consumption in China. 287 provincial-level and prefecture-level cities are studied in 2000, 2005, and 2010. Compact ratio index, shape index, and fractal dimension index are used to quantify urban form. Geographically weighted regression (GWR) model is employed to explore the relationship between urban form, energy consumption, and related carbon emission. The results show the average compact ratio index decreased from 2000 to 2010 which indicates urban in China sprawled. The average fractal dimension index increases by 3%, indicating the spatial layouts of China's cities were more complicated. The results by the GWR model show that shape index and fractal dimension index had a non-significant relationship with carbon emission by urban energy consumption. However, compact urban form reduced carbon emission. The findings of this study will help policy-makers make sustainable urban planning and reduce urban carbon emission.

Keywords : carbon emission, GWR model, urban energy consumption, urban form

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