

SPATIO-TEMPORAL PATTERNS OF BIKE-SHARING COMMUTING AND ITS POTENTIAL ON CO2 ABATEMENT: A BIG DATA ANALYSIS

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Overview

Bike sharing program has grown for decades and been considered as one of effective methods to alleviate urban traffic congestion and CO2 emission. As mobile technology developed, the station-less bike-sharing system (BSS) (such as mobike and ofo) appeared in China since 2015 and becomes more and more popular in many cities. The new BSS has changed residents' commuting pattern and recorded mass data which provides us new way to understand travellers' behaviour. This study aims to use BSS data to explore the spatio-temporal patterns of bike-sharing commuting and to evaluate the environmental benefits of BSS.

Methods

With the mobike data in Beijing, we use big data analysis to explore the spatio-temporal patterns of bike-sharing commuting. Then we evaluate the impacts of BSS on energy use and CO2 abatement by estimating the traffic demand with commuting and built environment data in Beijing.

Results

First, we find that BSS has a great potential on CO2 abatement.

Second, built environment has a significant effect on bike-sharing commuting modal and consequently affects CO2 emission environment in urban area.

Third, the abatement potential varied in different spatio-temporal scene.

Conclusions

We conclude that a shift to bike as commuting modal is beneficial to energy conservation and CO2 abatement in dense urban area. The urban planning of built environment will also play an important role in BSS commuting and CO2 emission. There should be more cycling-friendly infrastructures and policy to promote usage of BSS to produce more environmental benefits.

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