

Homothetic scaling of population and public transport accessibility in Chinese megacities

J. Raimbault^{1,2,3,*} and R. Lemoy⁴

¹ Center for Advanced Spatial Analysis, University College London

² Complex Systems Institute, UPS CNRS 3611

³ Géographie-cites, UMR CNRS 8504

⁴ IDEES, UMR CNRS 6266

* Cor.: j.raimbault@ucl.ac.uk

Topic *Part I: Modelling and measuring urban sprawl at multiple scales*

Abstract

The development of public transportation networks and associated transit oriented development policies are efficient tools to mitigate urban sprawl and its negative environmental impacts, especially in terms of commuting emissions. We study in this paper the trajectories in terms of sprawl and low carbon transport accessibility of the nine largest Chinese megacities, from 1990 to 2030 with projected transportation networks and populations. More precisely, we combine the Global Human Settlement Layer database with a temporal public transportation network database including planned transportation lines. We apply the homothetic scaling methodology to establish population and accessibility profiles. This technique allows quantifying and classifying different patterns of urban sprawl and their associated accessibility profiles. We also estimate the greenhouse gases emission gains thanks to public transport. Although they exhibit different temporal trajectories, we find that final profiles for population and accessibility unveil a homogenous distribution of accessibility and no strong inequality between radial layers of the studied cities. This shows that urban sprawl in China has less impact than what could be expected without appropriate transport policies.

Keywords

Public transport accessibility; Chinese megacities; Homothetic scaling; GHG commuting emissions