Dou Xinyu

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Skills

English: CET-6: 535

Computer: Familiar with CorelDraw; proficient in Python language; skilled in using ArcMap and MATLAB software.

Math: Familiar with advanced mathematics, linear algebra and mathematical statistics; interested in model and heuristic algorithm (I won Honorable Mention of Interdisciplinary Contest in Modeling).

Education

🌐 2019–Present   Department of Earth System Science, Tsinghua University

🌐 2015–2019   B.S.(GPA：**3.82/4.0**) School of Geographic Sciences, East China Normal University

Research

🌐 <u>**Who is the good neighbor? An analysis on the frontrunner cities with comparative advantages in low-carbon development**</u>

This study proposes a simple indicator, namely **good neighbor index**, to identify the frontrunner cities in low-carbon transformation, based on their **economic and emission performance**. By using the indicator, this study identifies good neighbors in a **static** and a **dynamic** view. The results show that static good neighbors in 2015 are mostly large cities with higher income and better industrial structure(Fig.1(a)), while the dynamic have achieved better economic growth and emission reduction from 2005 to 2015 although they have worse economic and emission basis(Fig.1(b)). The good neighbor list is not consistent with the list of national low-carbon pilot cities, which has to some extent overlooked the experience of some fast-growing cities.
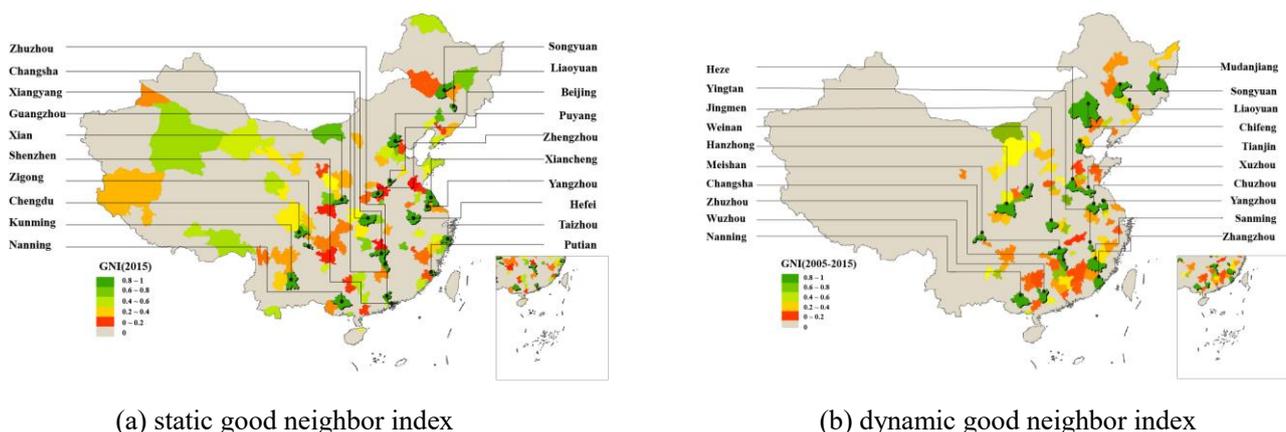

(a) static good neighbor index   (b) dynamic good neighbor index

Fig.1 Spatial distribution and good neighbor index for frontrunner cities

🌐 **Research on Driving Factors of Urban Sprawl Based on Multi-source Data**

(This thesis was awarded Outstanding Dissertation for Bachelor's Degree)

This study takes all countries as the research object, combines the global **land cover dataset** and **socio-economic statistic**s, and firstly analyzes the driving factors of urban sprawl by introducing the **panel model**. Secondly, **landscape pattern index** is used to distinguish urban sprawl modes, and the driving factors of urban sprawl in developed or developing countries and countries with different urban sprawl modes are analyzed respectively; finally, **standard deviation ellipse** method is used to analyze the spatial effect of driving factors.

The results show that during the period 1992-2015, urban population, third industrialization rate and gross domestic product (GDP) have a significant impact on global urban sprawl in general; the driving force of urban population to urban expansion has decreased with the development of the country. The improvement of traffic levels has promoted urban sprawl towards regularization and compactness, but the rapid growth of GDP and the tertiary industrialization rate is likely to cause the sprawl tends to be complicated, fragmented.

🌐 **Impact of metro passenger flow oh housing prices: an analysis using smartcard big data**

This study uses the Python language to extract the passenger flow from metro smartcard **big data**, and uses MATLAB to analyze the different effecting ranges of metro stations in different locations. Finally, ArcGIS is used for **spatial autocorrelation** analysis, and SPSS software is used to construct the **hedonic price model**. The relationship between metro passenger flow and hot spots of housing prices surrounding metro is shown in Fig.2.

The results show the influencing spheres of the metro stations gradually increase from inner circle to suburban area. Moreover, employment flow has positive impact on housing prices while residential flow has negative one.
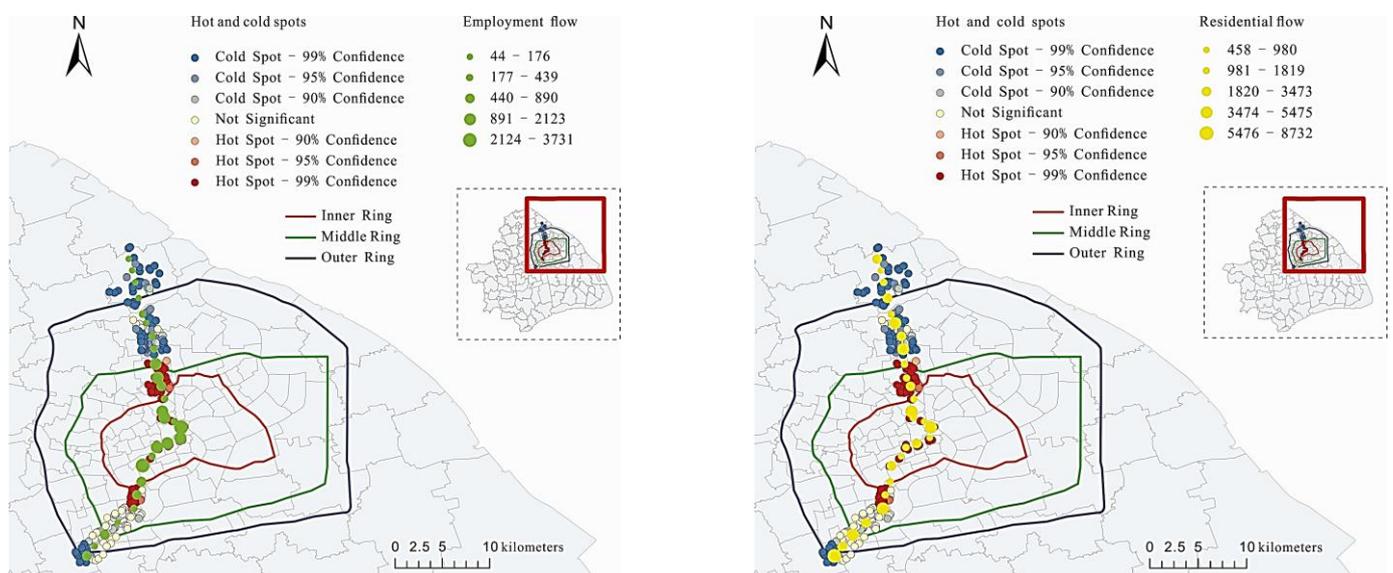

Fig.2　　Spatial autocorrelation results

🌐 3D building reconstruction and sunshine analysis based on LiDAR data

* Tianyang Lei and **Xinyu Dou**, "Sunshine Analysis and Visualization Based on LiDAR Data," *Journal of Geomatics Science and Technology* (under review)

(This project was awarded Third Prize of China College Students Computer Design Contest)

This research exploits high-resolution LiDAR data to quantify three-dimensional building morphology and its impacts on the spatio-temporal variability of sunlight in Beilun District, Ningbo, China. The CityEngine is used to realize the construction of the refined **3D model**. This model reflects the details of buildings' sunshine directly and reliably. Moreover, as shown in Fig.3, the temporal 3D building-sunlight model can be shared on the Internet which would benefit the design and development of 'smart city'.
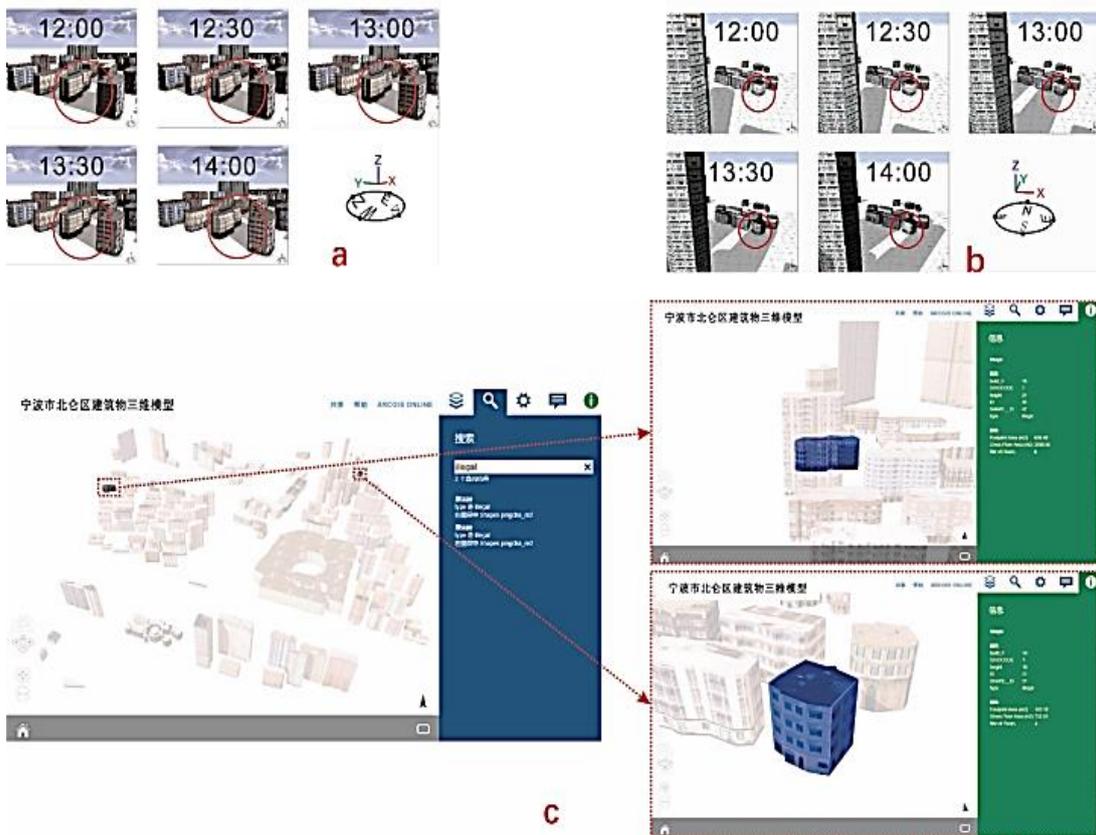

Fig.3 The temporal 3D building-sunlight model

Honors and awards

- ✓ 2019：Outstanding Dissertation for Bachelor's Degree of East China Normal University
- ✓ 2019：Shanghai Outstanding Graduates
- ✓ 2019：Outstanding Dissertation for Bachelor's Degree of East China Normal University
- ✓ 2018：Honorable Mention of Interdisciplinary Contest in Modeling
- ✓ 2018：Second price of Shanghai SAIC Education Cup.
- ✓ 2018：Third Prize of China College Students Computer Design Contest
- ✓ 2017：Second Prize of Shanghai Meteorological Data Apps
- ✓ 2017：National Scholarship