Spatial comparison of population density of the largest cities in the world: Distance decay effects

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Introduction

- The concept of day and night time average population is important for examining the population distribution dynamics of the cities.
- This study classify the top 50 cities of the world by integrating average population (day and night) concept and distance decay effects from the city centers.

Methodology

- Select the top 50 cities (Fig.1) by population using the UN stratification in the World Urbanization Prospects (2014).
- Generates a global population density surface of 2013 by employing LandScan™ 2013 raster grid file and area grid file
- Creates the five-kilometer distance buffers in an increasing stepwise for each city.
- The population density values for each zones are extracted using zonal statistic method in ArcGIS™.
- The liner graph for each cities are created based on the population density and distance from the city centers.
- Five basic population distribution patterns are developed by considering the shape of these liner graphs.

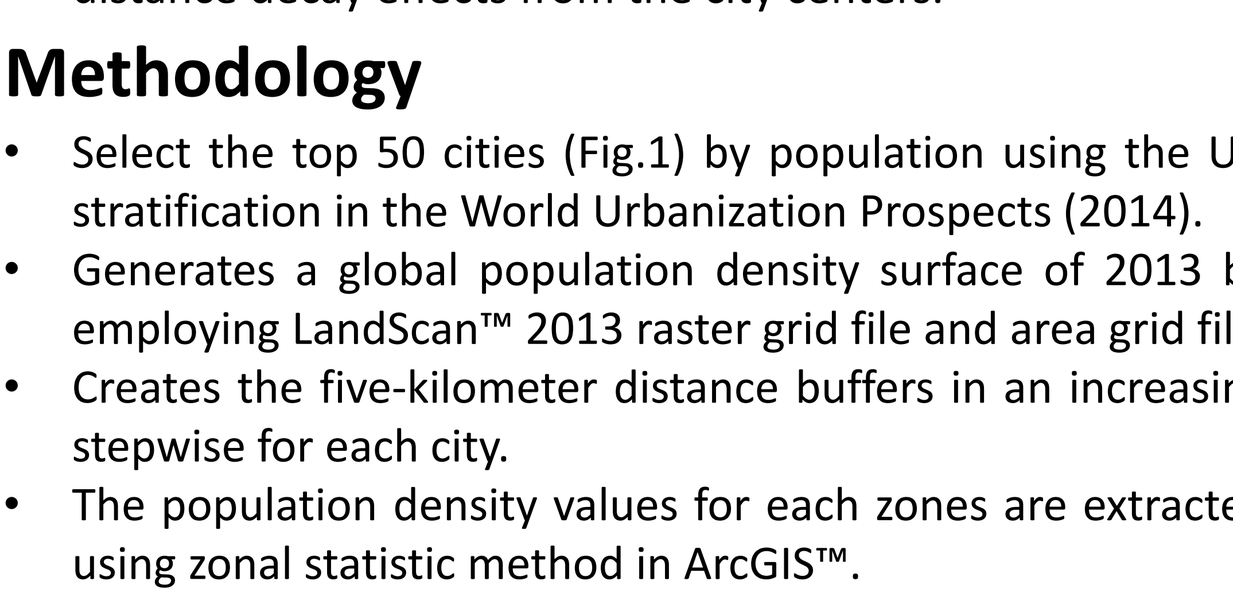

Fig. 1. Distribution of the 50 largest cities (black dots)

Future plan

- Analysis of the spatiotemporal changes of population distribution and predicting the future pattern of population distribution are needed.

Results

- Following figures show the obtained five patterns and their characteristics.

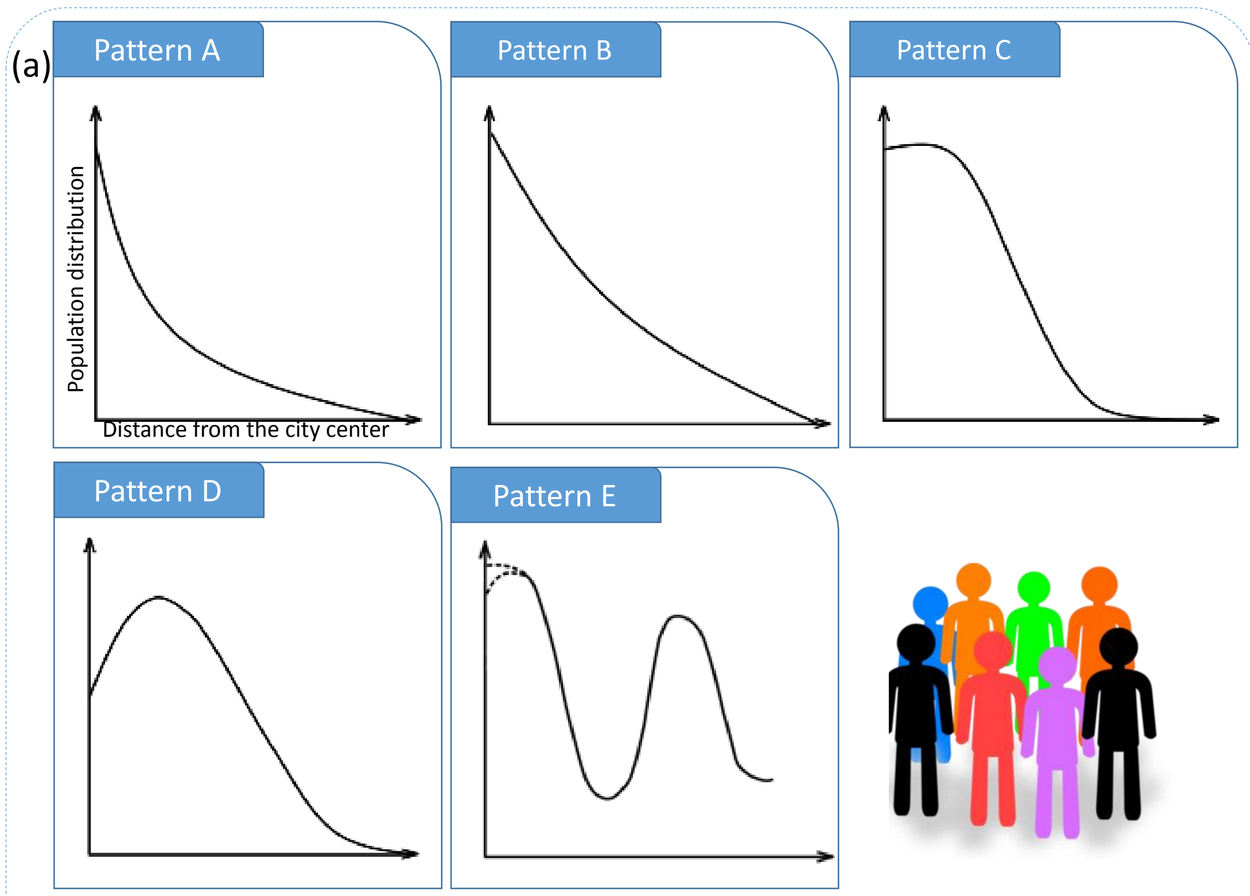

Fig. 2. (a) Five patters of population distributions; (b) characteristics of each pattern

Conclusion

- The spatial pattern of the population distribution is associated with global, regional and national factors.
- There is a great difference in the distance decay shape between developed and developing countries.

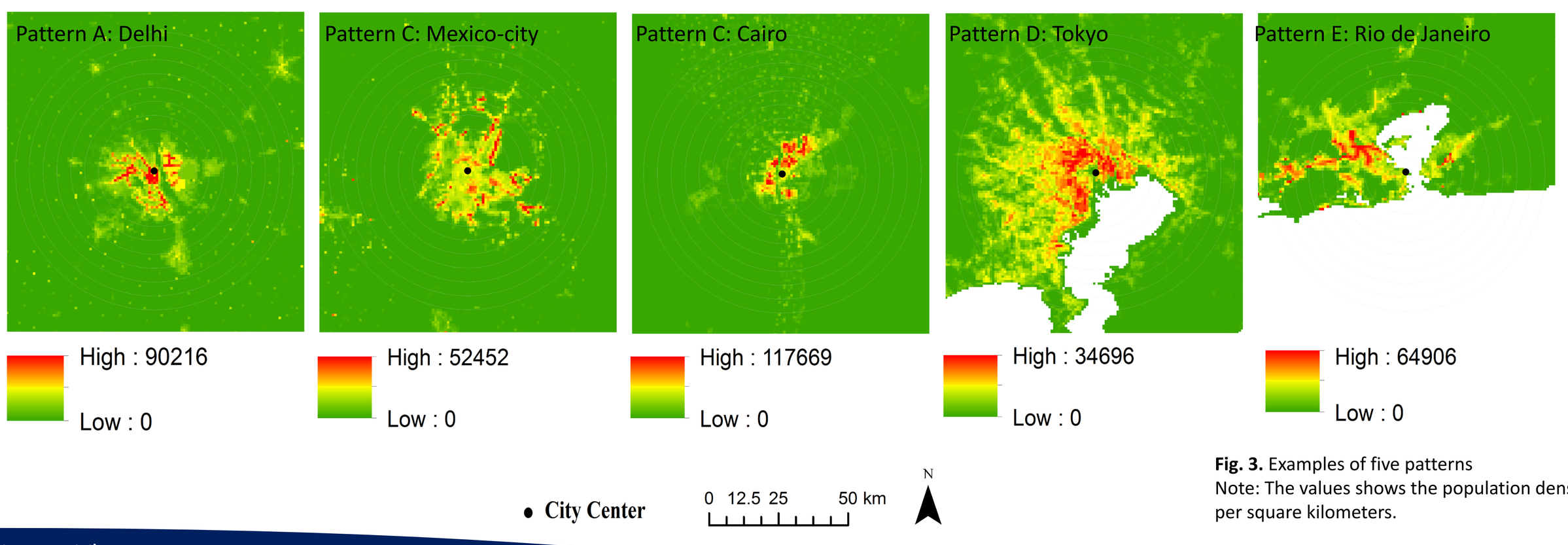

Fig. 3. Examples of five patterns
Note: The values shows the population density per square kilometers.

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