Spatio-temporal Relationships between Urban Growth and Economic Development in the Pearl River Delta Region of China

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ABSTRACT

This research aims to investigate the relationships between economic growth and urban expansion in the Pearl River Delta (PRD) region of China using a combination of remote sensing, geographical information systems (GIS), and spatial analysis techniques. Both spatial and temporal domains of these relationships will be addressed, so as to capture a comprehensive picture of the development process in this vigorous region.

The PRD region has experienced rapid economic growth since the initiation of economic reform in 1979. Two representative phenomena can be observed in line with the development: economic growth and urban expansion. It is apparent and hence widely believed that economic growth and expansion of built-up areas have a positive correlation. However, up to date only descriptive and qualitative exploration of this relationship has been made. This research attempts to quantify the spatial and temporal relationships between economic growth and urban expansion in the PRD region for the period 1990-2001.

Results show that positive correlation exists between economic growth and urban built-up area for the selected investigation year 1992, 1998, and 2001 at scale of county-level, except for Shenzhen and Guangzhou. Shenzhen and Guangzhou are identified as outliers from this linear relationship, implying that economic growth of these two cities is accompanied by improvement of land-use efficiency. For the other cities, economic growth mainly comes from expansion of urban built-up areas. Regarding temporal change, the linearity has strengthened, and the land-use efficiency improved, though not as rapidly as the economic growth, during last decade. Similar spatio-temporal patterns are also observed in Dongguan municipality at scale of town-level.

The findings of this research will be helpful for better understanding of the spatial and temporal relationships between economic development and urban growth in the PRD region. More importantly, the spatial and temporal patterns of the economic productivity can provide support to the decision-making about where, when, and how much land should be supplied for development in the PRD region.
KEYWORDS: Urban expansion, economic growth, spatial-temporal relationship, Landsat TM/ETM+ imagery, spatial analysis, Pearl River Delta region
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