

## Effect of spatial scale on dynamic pattern analysis of urban land use using spatial autocorrelation index: a case study of Yokohama

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In order to understand the mechanism and spatial process of urban dynamics so as to provide a basis for assessment of the ecological impacts of urban change and spatial decision-making support systems to municipality and civil planners, various spatial dynamic models, especially that based on cellular automata and geographical information system, of urban land-use change have been constructed and successfully applied to many cities in the world. However, spatial model of urban dynamics is greatly affected by the results of urban land-use pattern analysis, which is inseparable with spatial scale in theory and in reality. Therefore, some scientists are paying attention to the problem of spatial scale effect on urban land use pattern analysis.

Spatial scale is a fundamental problem in the discipline of landscape. Many approaches, such as landscape metrics and spatial autocorrelation index, have been applied to detect the effect of changing spatial scale on the interpretation of landscape. These methods also can be used for the study on the problem of spatial scale in urban land use pattern analysis. However, by now most efforts in this issue concentrated on the effect of spatial scale on urban land use pattern analysis in one section of time and few considered the effect on dynamic analysis of urban land use pattern. In fact, the main aim of urban land use pattern analysis in time series is to extract the spatial process of urban dynamics. Therefore, the research of spatial scale effect on dynamic pattern analysis of urban land use plays an important role in the interpretation of spatial process of urban dynamics. This research concentrates on this issue.

The objective of this paper is to give a case study of Yokohama to the problem of spatial scale effect on dynamic pattern analysis of urban land use so as to provide some useful information for the construction of spatial model of urban dynamics. Yokohama is one important city in Tokyo metropolitan area and urban area has grown rapidly from 1970s. The data set of land use in different times were aggregated systematically from 30m by 30m to 300m by 300m in an interval of 30m, and the spatial autocorrelation index of different land use category were calculated respectively so as to be used to compare the difference of characteristics of spatial autocorrelation of different land use category in time series. Spatial metrics were used to interpret the characteristics of spatial scale effect on dynamic pattern analysis of urban land use. Results indicate that spatial scale affects the interpretation of spatial process of urban dynamics and construction of spatial model of urban dynamics should consider the effect of spatial scale.