**Analysis of the Spatial Variations of Local Population Distributions from the Viewpoint of Urban Shrinkage Process**

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***ABSTRACT***

The population of Japan is estimated to be 124.09 million in 2024 and will fall below 100 million by 2053. In addition to causing a reduction in society's willingness to develop, such a decline in population makes it difficult to maintain the quality of public services, and may lead to further urban decline.The Ministry of Land, Infrastructure, Transport, and Tourism has been promoting measures to concentrate urban functions and population within walking distance of urban centers, but "urban spongification," in which vacant houses and lots are randomly generated in central city areas, has become an issue. The degradation of local communities and the deterioration of public safety and landscapes due to the urban spongification may hinder the concentration of the population. The continuous monitoring of urban structure is required to cope with urban spongification.We have focused on the spatial distribution of the population, and have developed a method to statistically define the areas where the population is locally low-density. By iterating the calculation of the size of a locally low-density population area and visualizing the variation over multiple time periods, it was possible to understand the variation in the spatial distribution of the population in detail. On the other hand, there are still few examples that analyze the spatial variation of population distribution on a city-by-city basis. In this study, we analyzed the features of spatial variation of population distribution in each city area using our method. Specifically, we clarified the features of the spatial distribution of the local population by dividing them into two types: the expansion and the shrinkage of the locally low-density area. Additionally, we attempted to classify the spatial variations with regard to the historical background and current situation of the cities.

**Keywords:** local population dynamics, population decline, densely populated area, urban spongification, spatial autocorrelation