

Comparison between the Pervious Surface Distributions and the Nighttime Air Temperatures from the View Point of Spatial Continuity

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Recently, pervious surfaces such as bare and grass lands are expected to contribute to the air temperature reduction against an urban heat island (UHI) phenomenon. In this study, we try to extract the spatial continuity of the pervious surface distributions according to the areas of the pervious surfaces in a test site. The impervious surface distributions derived from a digitized map data are applied to the analysis methodology we have developed so as to extract the spatial continuity of the pervious surfaces. The methodology consists of a spatial autocorrelation analysis, an overlay analysis, and a hydrological analysis. Application to the methodology leads to the generation of the map, called the Spatial Scale of Clumping (SSC), and the detection of the lines representing the spatial continuity of the pervious surface distributions in urban areas. We set several conditions with respect to the minimum area of the pervious surfaces. We also analyze the nighttime air temperatures derived from meteorological observation sites located around the lines detected through changing the conditions. It is obvious that the averages of nighttime air temperatures within the close range of the spatially continuous pervious surfaces located along the lines are significantly lower than those at the distant areas from them when the areas of the pervious surfaces are larger than 9 ha.

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