녹지·생태환경

UPD1) Comparison of Planning Elements for Improving the Thermal Environment in Urban Parks

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1. Introduction

The rapid urbanization of Korean cities has had a negative impact on the urban environment. The heat island phenomenon—when the temperature of the urban area is higher than its surrounding suburbs—is the main factor reducing the comfort of urban inhabitants and pedestrians. To remedy this phenomenon, studies have examined how to improve the micro-climate effects of green spaces, although active construction of green spaces in urban areas is restricted by spatial limitations. This paper suggests methods that could enhance the positive effects of an urban park on the urban thermal environment.

2. Methods

For research instruments, ENVI-met (ver. 4.3.1) was used, which is a micro-scale thermal simulation model. The temporal scope of this study was limited to a summer period because the thermal discomfort of urban areas is maximized in summer. Gyeongsang-gamyeong Park was chosen, which is located in Jung-gu, the central area of Daegu. The material of the pavement (granite vs. sandy soil, loamy soil) and vegetation (tree-cover ratio 15% vs. 30%) was selected as the comparison variable due to the heat properties of the pavement and the evapotranspiration of the vegetation, which affect the surrounding heat environment. Other elements were controlled.

3. Conclusions

First, we found that green spaces had a lower temperature than the surrounding areas. This result is important because it could prove that urban parks can relieve a city's heat load. Second, although both sandy and loamy soils are permeable pavements, the former aggravated the heat condition in the target area because of its thermal properties. It is thus a more effective way to apply loamy soil to pavement in parks than sandy soil or granite. Expanding tree-covered areas in the park decreased the temperature in certain cases because trees blocked solar radiation, which directly influences the temperature of the surface. It also showed a positive effect on the surrounding heat environment by disturbing hot air in the high-temperature area. Based on the results of this experiment, we suggest that using loamy soil and expanding tree-covered areas would be the most effective of the suggested methods to improve the heat environment in a central urban area and could decrease the temperature by around 1.3°C.

4. Reference

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