

A LST Study of the Seoul Metropolitan City, South Korea, Based on Landsat Data (1996 –2017)

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Rapid urban growth often replaced urban vegetation with impervious surfaces which leads to increase land surface temperature (LST) periodically and tends to form urban heat islands (UHI). This is a serious issue of urbanized cities and the increase of LST badly affects the well-being of the life and environments of the cities. The Seoul Metropolitan City (SMC), South Korea, is one of the developed and rapidly urbanizing metropolitan city in Asia. The aim of this study was to examine the spatiotemporal variations of LST in the SMC and surroundings in the context of the UHI using Landsat data. The study examined the relationship of LST with the normalized difference vegetation index (NDVI) and the normalized difference built-up index (NDBI) at three time periods 1996, 2006, and 2017. Also, the study was investigated the environmentally critical areas based on LST and NDVI by modeling environmental criticality index (ECI). According to the results of the study, there is a negative correlation between LST with NDVI and positive correlation of LST with NDBI across all three time periods. In SMC, most of the environmentally critical areas are located in the central business district (CBD), near the harbor, and along the main transportation network. According to the results of the study, it is recommended that the identified environmentally critical areas to be considered in the urban planning of the city. Green spaces of the city will help to improve the life and environmental well-being of the SMC.

Keywords: Urban Heat Island, Land Surface Temperature, NDVI, NDBI, Environmental Criticality Index, Seoul Metropolitan City