

1D2) 서울 도시 열섬의 시공간적 구조

Spatial and Temporal Structure of the Urban Heat Island in Seoul

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The spatial and temporal structure of the urban heat island in Seoul, Korea, is investigated using near-surface temperature data measured at 31 automatic weather stations (AWSs) in the Seoul metropolitan area for the one-year period March 2001 to February 2002. The urban heat island in Seoul deviates considerably from an idealized, concentric heat island structure, mainly due to the location of the main commercial and industrial sectors and the local topography. Relatively warm regions extend in the east-west direction and relatively cold regions are located near the northern and southern mountains. Several warm cores are observed, whose intensity, size, and location are found to vary seasonally and diurnally. Similar to previous studies, the urban heat island in Seoul is stronger in the nighttime than in the daytime and decreases with increasing wind speed and cloud cover, but it is least developed in summer. The average maximum urban heat island intensity is 2.2C over the one-year period and it is 3.4C at 03 local standard time (LST) and 0.6C at 15 LST. The reversed urban heat island is occasionally observed in the afternoon, but its intensity is very weak. An empirical orthogonal function (EOF) analysis is performed to find the dominant modes of variability in the Seoul urban heat island. In the analysis using temperature data averaged for each hour of the one-year period, the first EOF explains 80.6% of the total variance and is a major diurnal mode. The second EOF, whose horizontal structure is positive in the eastern part of Seoul and negative in the western part, explains 16.0% of the total variance. This mode is related to the land-use type and the diurnal pattern of anthropogenic heat release. In the analysis using temperature data at 03 LST, the leading four modes explain 72.4% of the total variance. The first EOF reflects that the weakest urban heat island intensity in summer. It is found that the urban heat island in Seoul is stronger on weekdays than weekends.

사 사

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