

Meteorological characteristics of an urban green zone in Seoul, Korea

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The urbanization is associated with change in the local climate and the deterioration of environmental conditions. With the rapid industrial development, the Seoul metropolitan area has been a tremendous growth in population and buildings for the last 50 years. This urbanization has changed the thermal environment and the wind flow pattern in the city. A number of investigations have suggested the mean temperatures in Seoul are higher than ones in suburban or rural regions (Park, 1986; Kim et al., 1999 and 2011; Kim et al., 2002). The mean temperature of Seoul for last 30 years (1981-2010) is estimated as 12.5°C which is 0.3°C higher than the one of the former 30 years (1971-2000) (KMA, 2011).

In this study, we analyzed consecutive measurements in urban and green area of Seoul, Korea for last two years (2013-2014). We examined the diurnal and seasonal variations in and around the urban green zone, and compared the thermal and hydrological characteristics among the observation sites. From the difference of temperature between urban and green area, we also attempted to find the characteristics of the cooling effects of the urban green zone on surrounding areas.

We figured out the diurnal and seasonal variations in the difference of temperature and specific humidity between urban and green areas. The maximum difference was 3.2 °C at 16 LST in August, and the minimum was -0.1 °C at 13 LST in March. Humidity difference result suggests the evapotranspiration has increased in summer when urban plants are biologically activated during the day-time. The cooling effect of the green area reached about 400m into the urban area during the night time. Further studies are needed in order to better understand the different factors (wind vector, solar radiation etc.) which explain efficiently the influence of the green areas.

Key words: urbanization, urban green area, cooling effect