

Evapotranspiration and its cooling effects on urban heat island

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於: 7号館A棟7階会議室

DATE: 6th June 2017 at 13:00-

VENUE: Meeting Room, #7A Bldg., 7F

speaker

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Keywords

Bowen ratio
evapotranspiration
fetch-free
infrared remote sensing
lawn
Shenzhen
three-temperature model
urban



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Evapotranspiration (ET) is one of the most important factors in urban water and energy regimes. Because of the extremely high spatial heterogeneity of urban area, accurately measuring ET using conventional methods remains a challenge due to their fetch requirements and low spatial resolution. The goals of this study were to investigate the characteristics of urban ET and its main influencing factors and subsequently to improve a fetch-free, high spatial resolution method for urban ET estimation. The Bowen ratio and the 'three-temperature model (3T model) + infrared remote sensing (RS)' methods were used for these purposes [1]. The results of this study are listed in the following lines. (1) Urban ET is mainly affected by solar radiation and the effects of air humidity, wind velocity, and air temperature are very weak; (2) The average daily, monthly, and annual ETs of the urban lawn are 2.70, 60-100, and 990 mm, respectively, which are obvious compared with other landscapes; (3) The ratio of ET to precipitation is 0.65 in the wet season and 2.6 in the dry season, indicating that most of the precipitation is evaporated; (4) The fetch-free approach of '3T model + infrared RS' is verified to be an accurate method for measuring urban ET and it agrees well with the Bowen ratio method (R^2 is over 0.93 and the root mean square error is less than 0.04 mm h⁻¹); (5) The spatial heterogeneity of urban ET can also be accurately estimated by the proposed approach. These results are helpful for improving the accuracy of ET estimation in urban areas and are useful for urban water and environmental planning and management.

協賛: 日本農業気象学会 リモートセンシング・GIS 研究部会
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