



High density street-level air temperature observations network (HiSAN) in tropical urban area

Tzu-Ping Lin (1), Tsuyoshi Honjo (2), Chun-Kuei Yao (1), Yu-Cheng Chen (1), and Feng-Yi Lin (1)

(1) National Cheng Kung University, Department of Architecture, Tainan, Taiwan (lin678@gmail.com), (2) Department of Environmental Science and Landscape Architecture, Chiba University, 271 Matsudo, Chiba 271-8510, Japan

Observation of air temperature at street level is essential for elaborating the urban heat island phenomenon and exploring the effect on human's thermal comfort and energy consumptions due to air-conditioning. Therefore, this study implements a high density street-level air temperature observations network (HiSAN) in Tainan, a highly developed city in tropical Taiwan. Concerning the instrumentation, a compact air temperature and humidity sensor are put in a small shelter and attached in the street light pole. For the measurement location, it is determined by the following criteria. Firstly, the measurement location should include the downtown area to rural area for further calculation of heat island intensity. Secondly, there should be similar distance between each two nearest points for future interpolation of the air temperature distribution estimation. Thirdly, the similar green area located in different area of the urban are selected as the measurement point for the representation of same land use type (greenery) but different distance to the downtown. Finally, since the Local Climate Zone (LCZ) is a classification of urban land use corresponding its thermal environment characteristic, the inhomogeneous LCZ of the measurement point will be also considered. According to the suggested guideline for the measurement points decision, totally 100 points is selected. These points covered in 21 km in north-south direction and 24 km in east-west direction. The average distance between two nearest points are 1.9 km and is lower in core area as 0.8 km. There are 19 points for the greenery area and 18 points classified as LCZ2 (middle high residential area). The initial results indicate a 3.5 degree C heat island intensity in night time. For future analysis, the spatial and temporal distribution of air temperature will be studied, and the effect of land use, energy consumption will be also discussed based on the data.