Monitoring urban heat signature and profiles of localized urban environment in the University of Malaya

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Abstract. Urban heat mainly caused due to the anthropogenic and due to heat stored and re-radiated from the sun. In a tropical country, activity during daylight is possible in a large part of the year, and such cities rapidly contribute to influence the global climate change as Urban Heat. Education area with their activity in university is similar to an urban area with a small scale. The university campus has a localized urban environment. The land cover in an university is similar to land cover in an urban area. Every land cover has its urban heat signature. This paper aims to understand the urban heat signatures (UHS) based on the land cover on the university campus. To answer the aim of the research, we used the collected temperature data based on land cover in the education area. Data collection for the ground air surface temperature with a survey by rapid 20 min at sample location by day and night time using a handheld air temperature tool. This result concluded land cover is related to the spatial-temporal of UHS. University of Malaya campus found UHS the relation within highest vegetation covered and UHS the lowest temperature, and the other hand building covered had UHS with the highest temperature. The result saw UHS behavior in 2013 had a temperature of 1.5 °C with max temperature maximum > 30 °C for all land use cover types within UM. The vegetation-covered had UHS with the lowest temperature, and the other hand building covered had UHS with the highest temperature. The localized urban environment also gave the UHS related to vegetation covered and the building covered. The vegetation-covered relation by UHS with the lowest temp and the other hand building covered relation by UHS with the highest temp. The rest of this result gave new insight that monitoring is essential for land cover management and significant for an assessment of UHS behavior in the university campus.

Keywords: Education area, land cover, monitoring, urban heat signature

1. Introduction

The study of urban heat firstly did in Europe country with first documentation of urban heat occurs in 1818 when Luke Howard’s groundbreaking study of London’s climate found an artificial excess of heat in the city compared with the country [1]. The study of urban heat in the US began in the first half of the century by Mitchell in 1953 and 1961 [2]. Case studies of individual cities are an early form of descriptive studies start with Schmidt in 1929 at Vienna, Sandberg in 1950 at Uppsala-Sweden, Newbold in 1966 in Singapore, and Sani in 1973 at Kuala Lumpur, Malaysia. In more recent time, descriptive studies took the form of surveys of urban climate in many cities or a region, for example, Switzerland