EFFECTS OF LAND SURFACE TEMPERATURE ON PM10 LOCAL VARIATIONS USING LANDSAT 8-TIRS AND GWR APPROACH

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AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Air pollution is one the environmental issues that brings global warming. The main factors that lead to the deterioration of air quality are the development and industrial growth and increasing energy consumption. The conventional regression approach such as Ordinary Lease Square (OLS) is not possible to represent the effects of temperature to pollutant parameter at local level. The aim of this study is to determine the effects of land surface temperature (LST) on PM10 local variations using Landsat 8- Thermal Infrared Sensor (TIRS) and Geographically Weighted Regression (GWR) approach in 2015 at Penang. The objectives of this study are to generate land surface temperature of study area, to extract value of LST and PM10 on virtual stations, and to determine the relationship between LST and PM10. The concentrations of PM10 were taken based on CAQM stations at Universiti Sains Malaysia (USM), and two stations at Prai while land surface temperature was derived from a thermal band of Landsat 8-TIRS. By using kriging interpolation on virtual stations, there were 565 locations utilized to extract the values of LST and PM10. The strong relationship between LST and PM10 is found based on the local regression analysis of the GWR, (r^2=0.606). The result also improved the global regression analysis (r^2= 0.026) in the relationship between both variables. In the local variation of the relationship between LST and PM10, there were 70 locations found statistically significant. In conclusion, the regression between satellite remote sensing and local regression approach such as Landsat 8-TIRS and GWR is possible to be used to determine the effect of land surface temperature towards air pollution.

TABLE OF CONTENTS