

Estimation of aerosol dispersion & urban air quality evaluation over Malaysia using MODIS satellite

ABSTRACT

Natural and anthropogenic aerosols varied extremely within space and time and affect the global radiation balance, and influence climatic changes. The objectives of this paper are to evaluate and characterize the dispersion of aerosols in the tropical region of Peninsular Malaysia using MODERate Resolution Imaging Spectro-radiometer (MODIS) measurements. The MODIS sensors on board the Terra satellite which enables remote sensing of aerosols at high spatial resolution and daily global coverage of data. This paper demonstrates the capability of MODIS to show the distribution of aerosol optical thickness (AOT) over the study area. Spectral characterizers of AOT measured over Peninsular Malaysia for the period 2005 – 2007 are analyzed to understand the variability of the AOT in different seasons and location. The result showed low values on wet season and high values during the dry season for case some days. For the Correlations of the MODIS-AOT with the ground-based particulate matter indicates the spread of the aerosols all over Kuala Lumpur. The regression analyses of the MODIS-AOT and PM_{2.5} concentration is strongly correlated (correlation coefficient $R = 0.75$). From the findings of this study we illustrate the strong potentiality of satellite remote sensing in regional ambient air quality monitoring as an extension to ground measurements. With the continual advancement of remote sensing technology and global data assimilation systems, AOT measurements derived from satellite remote sensors may provide a cost effective approach as a supplementary source of information for determining ground-level particle concentration.

Keyword: Aerosol dispersion; Estimation; Urban air quality; MODIS satellite data