

ESTIMATION OF PARTICULATE MATTER 10 (PM₁₀) CONCENTRATION USING LANDSAT 8 OLI IN JABODETABEK AREA DURING 2017-2019

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ABSTRACT

Air quality monitoring needs to be carrying out for environmental monitoring. The utilization of remote sensing data is required to support the limitations of the station-based methods in air quality monitoring. One of the parameters for measuring air quality is PM₁₀. This research proposed to assess the accuracy of the Landsat 8 OLI for modeling PM₁₀ and determine the spatial distribution analysis of PM₁₀ concentration in the Jabodetabek area. In addition, this research aims to examine the correlation between PM₁₀ concentration and meteorological data (rainfall, humidity, pressure, and temperature).

The Aerosol Retrieval Algorithm had used for modeling PM₁₀ concentration based on the linear correlation between atmospheric reflectance (ρ_{atm}) with PM₁₀ ground data. The validation test had been carried out with PM₁₀ data using the SEE method. Correlation analysis had been done to examine the correlation between PM₁₀ concentrations and meteorological data (rainfall, humidity, pressure, and temperature).

The accuracy of the model showed high accuracy with a low SEE value of 4.94031 and causes the result of accuracy is high, namely 91.87% to 93.13%. The model shows that the concentration of PM₁₀ was found high in the industrial area distributed in two provinces surrounding DKI Jakarta are West Java and Banten. The correlation analysis between the PM₁₀ concentration and the rainfall has a negative correlation with an R were 0.6415. In contrast, the correlation between the PM₁₀ concentration and the humidity, pressure, and temperature have a positive correlation. The humidity and pressure have the highest correlation values with R values of 0.49522 and 0.1928, while temperature parameters have an R of 0.00661.

Keywords: air quality, PM₁₀ concentration, remote sensing, Landsat 8 OLI, Aerosol Retrieval Algorithm, industry area, meteorological parameters