

## Estimation of PM10 Concentration Using Ground Measurements and Landsat 8 OLI Satellite Image

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**Abstract :** The aim of this work is to produce an empirical model for the determination of particulate matter (PM10) concentration in the atmosphere using visible bands of Landsat 8 OLI satellite image over Kirkuk city- IRAQ. The suggested algorithm is established on the aerosol optical reflectance model. The reflectance model is a function of the optical properties of the atmosphere, which can be related to its concentrations. The concentration of PM10 measurements was collected using Particle Mass Profiler and Counter in a Single Handheld Unit (Aerocet 531) meter simultaneously by the Landsat 8 OLI satellite image date. The PM10 measurement locations were defined by a handheld global positioning system (GPS). The obtained reflectance values for visible bands (Coastal aerosol, Blue, Green and blue bands) of landsat 8 OLI image were correlated with in-suite measured PM10. The feasibility of the proposed algorithms was investigated based on the correlation coefficient (R) and root-mean-square error (RMSE) compared with the PM10 ground measurement data. A choice of our proposed multispectral model was founded on the highest value correlation coefficient (R) and lowest value of the root mean square error (RMSE) with PM10 ground data. The outcomes of this research showed that visible bands of Landsat 8 OLI were capable of calculating PM10 concentration with an acceptable level of accuracy.

**Keywords :** air pollution, PM10 concentration, Landsat8 OLI image, reflectance, multispectral algorithms, Kirkuk area

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