

Estimating Air Particulate Matter 10 Using Satellite Data and Analyzing Its Annual Temporal Pattern over Gaza Strip, Palestine

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Abstract : Gaza Strip faces economic and political issues such as conflict, siege and urbanization; all these have led to an increase in the air pollution over Gaza Strip. In this study, Particulate matter 10 (PM10) concentration over Gaza Strip has been estimated by Landsat Thematic Mapper (TM) and Landsat Enhanced Thematic Mapper Plus (ETM+) data, based on a multispectral algorithm. Simultaneously, in-situ measurements for the corresponding particulate are acquired for selected time period. Landsat and ground data for eleven years are used to develop the algorithm while four years data (2002, 2006, 2010 and 2014) have been used to validate the results of algorithm. The developed algorithm gives highest regression, R coefficient value i.e. 0.86; RMSE value as 9.71 $\mu\text{g}/\text{m}^3$; P values as 0. Average validation of algorithm show that calculated PM10 strongly correlates with measured PM10, indicating high efficiency of algorithm for the mapping of PM10 concentration during the years 2000 to 2014. Overall results show increase in minimum, maximum and average yearly PM10 concentrations, also presents similar trend over urban area. The rate of urbanization has been evaluated by supervised classification of the Landsat image. Urban sprawl from year 2000 to 2014 results in a high concentration of PM10 in the study area.

Keywords : PM10, landsat, atmospheric reflectance, Gaza strip, urbanization

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