

1.213 Estimation of NO₂ Concentrations Within and Around three major cities of Pakistan by Using MAX-DOAS and Satellite observations..

Early Career Scientist

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Abstract:

Air pollution is one of the emerging issues in most of the cities of Pakistan. According to US AQI, Lahore stands second among the most polluted cities of the world. So, there is an utmost need of air quality monitoring in the country. Increasing traffic load, industrial development and constructional activities are contributing to air pollution. Air quality standards are regulated to minimize air pollution based on criteria pollutants such as NO₂. NO₂ is a major contributor to form smog, acid rain, tropospheric ozone and several other polluting compounds. This study was designed to monitor NO₂ in three major cities (Lahore, Islamabad and Multan) of Pakistan. Lahore was selected as the key study area; fixed monitoring was carried out at two different locations at Lahore and single site fixed monitoring was done in Islamabad by using MAX-DOAS. Several field campaigns were also carried out within and around the (Lahore, Islamabad and Multan) cities by using Car MAX-DOAS. NO₂ diurnal, weekly and annual cycle were observed. Results shows NO₂ concentration was higher in morning and evening but lower in the noon due to photolysis of NO₂. It was also observed that NO₂ was lowest on Friday day (Business holiday) and annual cycle shows highest average concentrations in winters and lowest in summers over Islamabad. NO₂ concentrations were occasionally exceeding Pak-NEQS limit (42.5 ppb) over Lahore, whereas Multan and Islamabad were in permissible limit during Field campaign. NO₂ MAX-DOAS measurements were also compared with OMI satellite observations and found a similar spatial distribution of NO₂. A good correlation was observed when MAX-DOAS data average of 01-02 pm (PST) was compared with OMI observations, as the satellite passes over Pakistan between 01-02 pm (PST). However, OMI satellite underestimate the NO₂ concentration as compare to ground based MAX-DOAS observations.