3.075 PERIODIC AND CONTIUNOUS MONITORING OF ATMOSPHERIC FORMALDEHYDE AROUND THE METROPOLITAN CITIES OF LAHORE, MULTAN, ISLAMABAD BY USING CAR MAX-DOAS.

Early Career Scientist

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Abstract:

An oxygenated Volatile Organic Compound (VOC), Formaldehyde, essentially contributes to the hazardous tropospheric ozone pollution in urban areas. Emissions from automobiles are the major contributors towards elevated formaldehyde concentrations in major urban cities of Pakistan, exposing the population to a polluted urban environment. This study was planned to quantify the formaldehyde concentration at two fixed places in the cities of Islamabad and Lahore for a period of two years and three months respectively. Besides Islamabad, the periodic mobile monitoring of HCHO over Lahore, Islamabad and Multan Pakistan was also included in the designed study. MAX-DOAS (Multi-Axis – Differential Optical Absorption Spectroscopy) instrument was used to measure the diurnal, weekly and annual cycle in HCHO concentration at fixed station and field campaigns. The diurnal concentration trend exhibited maxima in morning and evening and minima at the noon time. The weekly course reveals the higher values in working day and lesser values during the weekend, while the annual cycle shows the highest concentration in summer followed by spring, autumn and winter. During Field campaigns the maximum mean values of HCHO over Lahore were found to be 164, 108, 283 ppbv, meanwhile; the maximum mean value in Multan was 161 ppbv, exceeding the limit prescribed by WHO (83 ppbv). The suspected sources of HCHO along the route were gas stations, emissions from industries including brick kilns, steel mills, oil mills etc and vehicular emissions.

Upon comparing monthly OMI satellite observations with ground-based formaldehyde values, a good correlation was noticed within the time span of 1-2 pm (PST). The allocated time was selected as it was satellite passing time over Pakistan.