Long-term Air Quality Assessment on Kuala Lumpur Extended Mega-Urban Region (KLEMUR)

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Problem Statement: Kuala Lumpur Extended Mega-Urban Region (KLEMUR) has undergone rapid development since few years back. Rapid development can increase the air pollutant emission and affect the human health and the environment. Measuring the concentration of air pollutants continuously is important in order to monitor the air quality of an area. **Objective:** Thus, long-term evaluation of air quality in Kuala Lumpur Mega-Urban Region (KLEMUR) was carried out using data recorded by Department of Environment Malaysia from 1998 to 2015 to determine the long-term trends of air quality in the region. **Methodology:** Variations of seven air pollutants (O_3, CO, NO, NO_2, NO_x, SO_2 and PM_{10}) measured from five continuous air quality monitoring stations (Klang, Petaling Jaya, Shah Alam, Nilai and Bukit Rambai) were analyzed. The univariate statistical descriptive analysis was performed by using Statistical Package for Social Sciences (SPSS) software and followed by ratio analysis. **Results:** The result showed that the annual mean of PM_{10} concentration for all selected stations located at Kuala Lumpur Extended Mega-Urban Region exceeded the maximum allowable limit of New Malaysian Air Quality Standard (NMAQS) (50 μgm^{-3}) and World Health Organization (WHO) maximum limit (20 μgm^{-3}). Nilai and Shah Alam stations showed the ascending trends of PM_{10} concentration within eighteen years while other stations with decreasing trends. This is due to main activities in the areas (Nilai and Shah Alam) are related to industrial. Other air pollutants (NO, NO_2, and NO_x) showed an upward trend especially Nilai and Bukit Rambai station. The O_3 concentrations recorded higher in Shah Alam station compared to other stations. While the SO_2 and CO showed a downward trend throughout the eighteen years period. Ratio analyses between air pollutants shows Kuala Lumpur Mega-Urban Region (KLEMUR) air quality influenced by mobile sources. This is because ratio values of CO/NO_x (between 16.4 and 49.3) were high; ratio values of SO_2/NO_x (between 0.05 and 1.01) were low and the ratio value of NO/NO_2 of this study between 0.39 and 2.74. The Petaling Jaya station recorded as serious affected by the traffic emissions since the ratio value of NO/NO_2 exceeded 2.0. The patterns of monthly concentration showed that the concentration of air pollutants in Kuala Lumpur Mega-Urban Region (KLEMUR) (CO, NO, NO_2, NO_x, SO_2 and PM_{10}) were higher during the southwest monsoon (June-September). While monthly trends of O_3 showed that highest concentration recorded during January till March since the presence of high ultraviolet (UV) radiation, minimal rainfall and low cloud cover values early in the year. **Conclusion:** The air quality in Kuala Lumpur Mega-Urban Region (KLEMUR) seriously influenced by particulate matter. PM_{10} concentrations within eighteen years exceeded the maximum values recommended by the New Malaysian Air Quality Standard and World Health Organization (WHO) air quality standard. Thus, well-planned development is crucial to reduce the magnitude of the increasing trend in pollutant concentrations.