

Spatio-Temporal Analysis of Air Pollutants Concentrations Before During Post-Movement Control Order (MCO) in Klang Valley

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Structured Abstract

Background: Implementation of MCOs during pandemic of COVID-19 has significantly reduce the air pollutants concentration in ambient air, indicates an improves of air quality. Limitation of people movement also restriction on normal business and daily activity, strongly impacts on the air pollutants emissions, from various man-made source such as motor vehicles, power plant and industrial activity. The study aims to analyse the air pollutants concentration, which are particulate matters, PM₁₀ and PM_{2.5}, carbon monoxide (CO), sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) from spatial and temporal variations, according to the timelines of MCOs implementation, as well as the influences of meteorological factors. The results will help understand the patterns of air pollutant's reduction and support for better mitigation and control measures of air pollutants.

Methods: Air pollutants daily data in 2020 retrieved from Department of Environment (DOE) and analysis were conducted using time-series analysis by R Statistical programme, spatial interpolation by Inverse Distance Weighting in ArcGISPro and correlation analysis by Statistical Package for Social Science (SPSS).

Results: The temporal patterns indicate significantly reduction of PM₁₀, PM_{2.5}, CO and NO₂ during the phases of MCO, majorly in all six-monitoring station across Klang Valley. Motor vehicles reduction during MCOs has identified as notable factors affecting. SO₂, otherwise, maintain at same range of concentration in the ambient air. Next, the spatial distribution of all air pollutants throughout Klang Valley from before until post MCOs remained at same range distribution, indicates good and moderate breakpoint parameter according to New Malaysian Ambient Air Quality Standards (MAAQS) 2020. Additionally, this study determined a moderate and strong correlation between air pollutants with meteorological factors in which are temperature, relatively humidity and wind speed, that varies according to the station location and period of MCOs.

Conclusion: In conclusion, reduction of various air pollutants occur in Klang Valley is due to the MCOs implementation, which limiting the sources of the air pollutants emissions, as well as little factor from meteorological factors. The spatial distribution of air pollutants in Klang Valley must be monitor and be alert with any significant changes. In addition, it is recommended for further studies on reduction of air pollutants with specific land use, as to provide insights for authorities in creating a better policies and mitigation control, to ensure improves of air quality.

Keywords: Air pollutants, MCOs, spatial distribution, temporal pattern, meteorological factors

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