Abstract No: 164 ***Earth and Environmental Sciences***

AIR QUALITY TRENDS AND PATTERNS IN KANDY, SRI LANKA

S.M.D.M.C. Senarathna[1,2]*, R. Jayaratne[3], L. Morawska[3], K. Walikannage[4], R. Weerassoriya[2] and G. Bowatte[5]

[1]Postgraduate Institute of Science, University of Peradeniya, Peradeniya, Sri Lanka
[2]National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka
[3]International Laboratory for Air Quality and Health, Queensland University of Technology, Brisbane, Queensland 4001 Australia
[4]Central Environmental Authority, North Western Province, Kurunegala, Sri Lanka
[5]Faculty of Allied Health Sciences, University of Peradeniya, Peradeniya, Sri Lanka
[*]mahesh.se@nifs.ac.lk
[*]smdmaheshchamika@gmail.com

Air pollution is one of the leading environmental hazards that causes devastating health effects on human health. Identifying air pollution trends and patterns in a particular geographic area is essential for controlling air pollution. Monitoring air pollution in most low- and middle-income countries using standard air pollution monitoring networks is not affordable. In this study, we aimed to investigate the variations in the mean concentrations of $PM_{2.5}$ that occur at various times of the day, days of the week, and months of the year in Kandy, Sri Lanka, using small sensors. A regression analysis with dummy variables was used to model the relationship between the concentrations of $PM_{2.5}$ and categorical independent variables like the time of day and day of the week. One year of data was obtained from a calibrated real-time small, low-cost air quality sensor called "KOALA" installed at the National Institute of Fundamental Studies, Kandy, for the temporal variation. The study results showed that, for temporal variations, the morning and evening are the times with the most pollution, while the afternoon has the least pollution. The regression analysis model revealed significant hourly variations ($p < 0.05$) in $PM_{2.5}$, with the highest levels observed at 07:00 (coefficient = 13.70), followed by a decrease at 14:00 (coefficient = -1.97), and an increase at 18:00 (coefficient = 9.74) compared to reference hour (00:00). Air quality from Wednesday to Thursday is the worst, while Sundays exhibited the lowest air pollution, obviously due to reduced human activities. The monthly variation showed that December had the cleanest air, while $PM_{2.5}$ were significantly higher (34.87 µg m^{-3}) in March 2019. The variation in $PM_{2.5}$ was greatly influenced by wind speed, wind direction, and rainfall patterns. These findings highlighted the significance of maintaining strict air pollution management and monitoring regimens.

Financial assistance from National Science Foundation (No: RG/2019/BS/01) is acknowledged.

Keywords: Air quality, Low-cost sensors, $PM_{2.5,}$ Trends and patterns