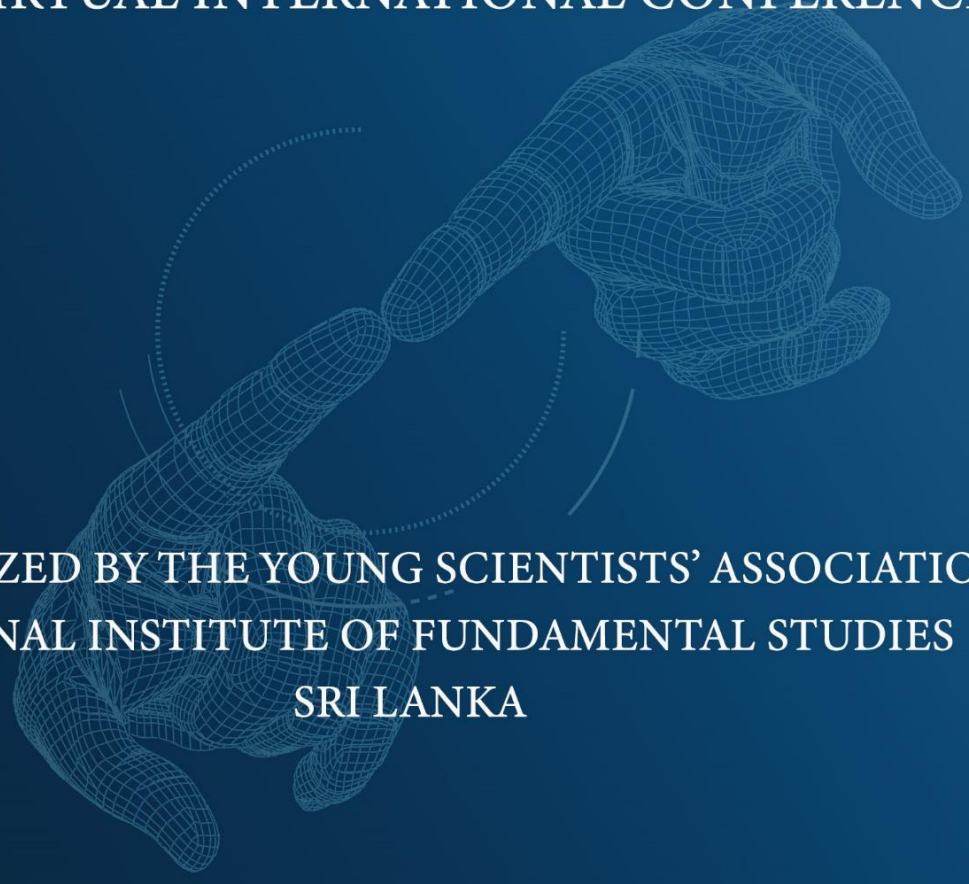
Proceedings of the

YSCMR 2023

YOUNG SCIENTISTS' CONFERENCE ON MULTIDISCIPLINARY RESEARCH

VIRTUAL INTERNATIONAL CONFERENCE



ORGANIZED BY THE YOUNG SCIENTISTS' ASSOCIATION
NATIONAL INSTITUTE OF FUNDAMENTAL STUDIES
SRI LANKA

YSCMR 2023

Proceedings of the

Young Scientists' Conference on Multidisciplinary Research - 2023

Virtual International Conference

09th November 2023

"Artificial Intelligence Empowering Research Across Disciplines"

ISSN 2815-0260
Proceedings of the Young Scientists' Conference on Multidisciplinary Research-2023
Young Scientists' Association, National Institute of Fundamental Studies, Sri Lanka
09th November, 2023

Paper ID: CMT-041

Diurnal and seasonal variations of ground-level ozone and nitrogen dioxide in Battaramulla and Kandy, Sri Lanka

P.M. Batuwita[1*], R.A.W. Ranawaka Arachchi[2], P.U. Santhiyago[2], L.U. Kalpage[2], J.J.M.A.D. Jayasundara[2], G. Naveendrakumar[1]

[1]*Department of Bio Science, Faculty of Applied Science, University of Vavuniya, Sri Lanka*
[2]*Central Environmental Authority, Battaramulla, Sri Lanka*

[*]*piyumibatuwita@gmail.com*

This study examines the impact of solar radiation on ozone (O_3) formation and nitrogen dioxide (NO_2) depletion in Battaramulla and Kandy, Sri Lanka. Objectives include investigating diurnal and seasonal variations of solar radiation levels, assessing ozone and nitrogen dioxide levels, and exploring the relationship between solar radiation and ozone formation as well as nitrogen dioxide depletion. A short-duration time series analysis used data from air quality monitoring stations in Battaramulla and Kandy collected for the year 2020. Hourly measurements of O_3, NO_2, and solar radiation (Wm^{-2}) were recorded. Time series plots and descriptive statistics identified data behavior, and summarized data were utilized to discern interdependencies among solar radiation, ozone formation, and nitrogen dioxide depletion. The analysis revealed higher O_3 concentrations during peak solar radiation periods, indicating sunlight-induced photochemical ozone formation. A negative correlation was observed between O_3 and NO_2 concentrations, suggesting higher ozone levels correspond to lower nitrogen dioxide levels. On weekends, higher average maximum O_3 values were observed compared to weekdays. The study also established a positive relationship between solar radiation and ozone concentrations, emphasizing the significant role of solar radiation in ozone formation. The diurnal cycle of ozone concentration exhibited a midday peak and lower night time concentrations, potentially influenced by meteorological conditions. Variations in O_3 and NO_2 between Battaramulla and Kandy could be attributed to a combination of factors including differences in local emission sources, meteorological conditions, topography, and atmospheric chemistry. Battaramulla, a suburb of Colombo, may have higher vehicular emissions contributing to elevated NO_2 levels. Kandy, located in the central highlands, may have distinct topography and meteorological conditions that affect pollutant dispersion and photochemical reactions. This study provides valuable insights for ozone forecasting and air pollution control strategies. Further investigation may be required to understand the mechanisms underlying the observed weekend effect on ozone production.

Keywords: *Air quality monitoring, ambient ozone, ground-level meteorology, midday peak ozone, solar influx*