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Diurnal and Seasonal Variability of Ambient Ozone over Nyarugenge District in Kigali City

The ambient ozone over Nyarugenge district in Kigali City varies seasonally, the study analyzes the near surface ambient ozone within a period of three years starting from 2010 to 2012 using openair model (R package) which is an open-source tools for analyzing air pollution data, and correlated with its corresponding meteorological parameters including air temperature, relative humidity, wind speed and wind direction. The highest ambient ozone concentration along a day was observed between 10am to 3pm, this is because its chemical formation is a photochemical reaction. For wind speed above 2.81m/s ambient ozone increases as solar radiation increase while for wind speed level greater than 2.81m/s the ambient ozone concentration decreases by increasing of atmospheric relative humidity. The average wind speed recorded was at 3.7402 m/s with calm condition of 0% during July to September 2020 and pollution rose of 22.85 from 17th to 23rd September 2020. The dominant wind direction was elaborated together with their frequency. During dry seasons the ambient ozone concentration in Kigali is very high compare to the wet seasons and this affect the nearby rural area (downwind), the major cause of this increase include the biomass burning, higher solar radiation intensity, contribution of transboundary pollutants and lower pollutants removal processes. For mitigating increase of ambient ozone and generally air pollutants there is a need to install lower cost air quality monitoring instruments in different zone across the country for its monitoring, mobilizing smart driving, the use of motorcycle and auto cycle which use electric power instead fuels as trafficking emission is among the main pollutants sources in Kigali, the use of air filter on chimney of the manufacturing industries and other technics for minimizing emission.

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