

Abstract

Concurrent measurement and analysis of Nitrogen dioxide (NO₂) and Ozone (O₃) are essential for improved understanding of ozone distribution. This study sought to analyse the temporal evolution of total column NO₂ and O₃ over Nairobi using satellite-derived daily data between 2009 and 2013. Seasonality is observed in O₃ distribution with minimum and maximum occurring during the dry and wet seasons, respectively. Additionally, a lag of about a month or two occurs between the onset of a season and corresponding minimum or maximum NO₂ and O₃ concentration. The established association between monthly NO₂ and O₃ is such that, above average concentration of NO₂ is likely to lead to above average levels of O₃ during the same month ($r=0.79$) and below average levels about 5 months later ($r=0.39$). The Quasi Biennial Oscillation (QBO) is the main phenomenon behind the oscillating biennial feature exhibited by NO₂ and O₃ interannual trend. The study shows that NO₂ and O₃ are increasing at annual average rates of about 0.27% and 0.46% per year compared to mean values, respectively. Daily variation of both NO₂ and O₃ depicts stagnating trends over the entire period of study. This difference is attributed to the fact that, whereas daily NO₂ and O₃ are influenced by mechanisms that control the slow shift between the dry and wet periods within the course of a year, interannual variability is driven by the differences in each year's general weather conditions.