



The Kinetic Approach of NO_x Photoreaction Related to Ground Measurement of Solar Radiation in Estimates of Surface Ozone Concentration

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Abstract : Surface ozone is a secondary pollutant produced by the collision of oxygen molecules with oxy-radicals as a result of the photoreaction of nitrogen oxide. Excessive levels of this pollutant cause negative impacts on the environment. Moreover, understanding the formation kinetics and precursors are important for air quality management. This study aims to determine the surface ozone reaction kinetics of formation phase dominant factors (NO_x precursors and influx radiation) in urban areas. These kinetics are based on the recorded measurements of global radiation, remaining NO_x and ozone concentration at ground level from air quality monitoring. These data are then categorised for rainy and dry seasons. Each data category was analysed according to daily pattern and daily maximum value. The relationship and kinetic constants of concerned parameters were determined. The ozone concentration is proportional by factor k to the influx radiation and conversely to the remaining nitrogen dioxide in the first-order photoreaction. This relationship is linear with R² greater than 0.9 during both rainy and dry seasons. The value of kinetic constant k is equal to 1.1044 for rainy seasons and to 0.8416 for dry seasons. It shows the factor of influx radiation and remaining [NO_x] in an atmosphere with a dominant rainy as compared to dry season.

Keywords: Air quality, Photochemical kinetics, Atmospheric oxidation, Influx radiation, Urban.

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