

Measurements and Analysis of Air Quality in Bangkok Metropolitan Region, Thailand

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Analysis of gaseous pollutants from 15 monitoring stations located in Bangkok, Thailand, and five adjacent provinces, i.e. Bangkok Metropolitan Region (BMR), during 2010 to 2014 reveals that hourly concentration of CO, SO₂ and NO₂ were mostly below the National Ambient Air Quality Standards (NAAQs) of Thailand (NAAQs for CO: 30 ppm, SO₂: 300 ppb, NO₂: 170 ppb). However, the hourly concentration of ozone (O₃) exceeded the NAAQs (NAAQs for O₃: 100 ppb). The maximum concentration of O₃ ranged from 120 to 190 ppb, and the number of exceedances of hourly O₃ ranged from 4 to 250 hours a year. The exceedances were found only during dry season (both summer i.e. February to April; and winter i.e. November to January) Inter-conversion between O₃, NO and NO₂ indicates the crossover point between species, occur when [NO_x] is ~60 ppb. When the [NO_x] < 60 ppb, O₃ is the dominant species; conversely, NO dominates when [NO_x] > 60 ppb. The calculated photochemical reaction rate (*j*) during the photostationary state ranges from 0.12 to 1.22 min⁻¹; with no significant with season and location (P-value > 0.05). Fitted linear regression between [O_x] (O_x = O₃+NO_x) and NO_x provides effects associated with local and regional (background, i.e. due to transport of ozone) contributions on O_x. Over the BMR, the local and regional O₃ contributions played an important role to increase the concentration of O_x; those values were about double during O₃ episode ([O₃] > 100 ppb).