VARIATION OF NO_2 and NO_x CONCENTRATIONS AND NO_2 and NO_x LAND USE REGRESSION (LUR) MODELS IN 37 STUDY AREAS IN EUROPE

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Background and Aims: NO_2 and NO_x are important pollutants because they have been used extensively as a marker for several air pollutants in motor vehicle exhaust. Within ESCAPE, measurements of NO_2 and NO are made to develop land use regression (LUR) models. The comparison between and within study areas concerning the measured NO_2 and NO_x variation and the results of LUR modelling will be presented.
Methods: In the framework of ESCAPE, annual mean NO_2 and NO_x were estimated in 37 study areas across Europe between in 2008-2010. In each study area the concentrations were measured at 40-80 monitoring sites. The measurements were conducted for two weeks per site in three different seasons, using Ogawa badges. The calculated annual means were regressed against several GIS data. Here we present the results for 6 selected study areas: Barcelona, Catalunya, Dutch-Belgian, Ruhr, Munich-Augsburg, and Erfurt.
Results: Between and within all study areas significant variation was found for NO_2 and NO_x concentrations. In study areas in southern Europe the highest median levels and ranges (10-90th percentile) were observed (NO_2: 55 (34-82) µg/m³, NO_x: 90 (48-158) µg/m³). In densely populated areas in Central Europe smaller median levels and ranges were observed (NO_2: around 30 (20-45) µg/m³, NO_x: 45 (30-90) µg/m³). A small city in a less densely populated area (Erfurt, Germany) showed lower median and ranges (NO_2: 18 (12-30) µg/m³, NO_x: 26 (17-48) µg/m³). Land use regression models were developed which explained a large fraction of the measured variance of NO_2 (R^2 between 0.71-0.89) and NO_x (R^2 between 0.69-0.88). All LUR models include variables which cover road traffic as substantial predictor variables.
Conclusions: There was a substantial spatial variation in annual mean NO_2 and NO_x between and within all study areas. LUR models were developed which explained a large fraction of variability, with road traffic being the most important predictor.