

Publication

Western European land use regression incorporating satellite- and ground-based measurements of NO₂ and PM₁₀**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 2330907**Author(s)** Vienneau, Danielle; de Hoogh, Kees; Bechle, Matthew J.; Beelen, Rob; van Donkelaar, Aaron; Martin, Randall V.; Millet, Dylan B.; Hoek, Gerard; Marshall, Julian D.**Author(s) at UniBasel** [Vienneau, Danielle](#) ;**Year** 2013**Title** Western European land use regression incorporating satellite- and ground-based measurements of NO₂ and PM₁₀**Journal** Environmental Science and Technology**Volume** 47**Number** 23**Pages / Article-Number** 13555-64**Mesh terms** Air Pollutants, analysis; Air Pollution, analysis; Altitude; Cities; Environmental Monitoring, methods; Europe; Models, Theoretical; Nitrogen Dioxide, analysis; Particulate Matter, analysis; Satellite Imagery

Land use regression (LUR) models typically investigate within-urban variability in air pollution. Recent improvements in data quality and availability, including satellite-derived pollutant measurements, support fine-scale LUR modeling for larger areas. Here, we describe NO₂ and PM₁₀ LUR models for Western Europe (years: 2005-2007) based on <1500 EuroAirnet monitoring sites covering background, industrial, and traffic environments. Predictor variables include land use characteristics, population density, and length of major and minor roads in zones from 0.1 km to 10 km, altitude, and distance to sea. We explore models with and without satellite-based NO₂ and PM_{2.5} as predictor variables, and we compare two available land cover data sets (global; European). Model performance (adjusted R²) is 0.48-0.58 for NO₂ and 0.22-0.50 for PM₁₀. Inclusion of satellite data improved model performance (adjusted R²) by, on average, 0.05 for NO₂ and 0.11 for PM₁₀. Models were applied on a 100 m grid across Western Europe; to support future research, these data sets are publicly available.

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