

Publication

Development of West-European PM_{2.5} and NO₂ land use regression models incorporating satellite-derived and chemical transport modelling data**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**

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Satellite-derived (SAT) and chemical transport model (CTM) estimates of PM_{2.5} and NO₂ are increasingly used in combination with Land Use Regression (LUR) models. We aimed to compare the contribution of SAT and CTM data to the performance of LUR PM_{2.5} and NO₂ models for Europe. Four sets of models, all including local traffic and land use variables, were compared (LUR without SAT or CTM, with SAT only, with CTM only, and with both SAT and CTM). LUR models were developed using two monitoring data sets: PM_{2.5} and NO₂ ground level measurements from the European Study of Cohorts for Air Pollution Effects (ESCAPE) and from the European AIRBASE network. LUR PM_{2.5} models including SAT and SAT+CTM explained 60% of spatial variation in measured PM_{2.5} concentrations, substantially more than the LUR model without SAT and CTM (adjR(2): 0.33-0.38). For NO₂ CTM improved prediction modestly (adjR(2): 0.58) compared to models without SAT and CTM (adjR(2): 0.47-0.51). Both monitoring networks are capable of producing models explaining the spatial variance over a large study area. SAT and CTM estimates of PM_{2.5} and NO₂ significantly improved the performance of high spatial resolution LUR models at the European scale for use in large epidemiological studies.

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