

**Publication****Land use regression models for ultrafine particles in six european areas****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 3848417**Author(s)** van Nunen, Erik; Vermeulen, Roel; Tsai, Ming-Yi; Probst-Hensch, Nicole; Ineichen, Alex; Dav-ey, Mark; Imboden, Medea; Ducret-Stich, Regina; Naccarati, Alessio; Raffaele, Daniela; Ranzi, Andrea; Ivaldi, Cristiana; Galassi, Claudia; Nieuwenhuijsen, Mark; Curto, Ariadna; Donaire-Gonzalez, David; Cirach, Marta; Chatzi, Leda; Kampa, Mariza; Vlaanderen, Jelle; Meliefste, Kees; Buijtenhuijs, Daan; Brunekreef, Bert; Morley, David; Vineis, Paolo; Gulliver, John; Hoek, Gerard**Author(s) at UniBasel** [Probst Hensch, Nicole](#) ; [Tsai, Ming-Yi](#) ; [Ineichen, Alex](#) ; [Imboden, Medea](#) ; [Ducret-Stich, Regina](#) ;**Year** 2017**Title** Land use regression models for ultrafine particles in six european areas**Journal** Environmental Science and Technology**Volume** 51**Number** 6**Pages / Article-Number** 3336-3345

Long-term ultrafine particle (UFP) exposure estimates at a fine spatial scale are needed for epidemiological studies. Land use regression (LUR) models were developed and evaluated for six European areas based on repeated 30 min monitoring following standardized protocols. In each area; Basel (Switzerland), Heraklion (Greece), Amsterdam, Maastricht, and Utrecht ("The Netherlands"), Norwich (United Kingdom), Sabadell (Spain), and Turin (Italy), 160-240 sites were monitored to develop LUR models by supervised stepwise selection of GIS predictors. For each area and all areas combined, 10 models were developed in stratified random selections of 90% of sites. UFP prediction robustness was evaluated with the intraclass correlation coefficient (ICC) at 31-50 external sites per area. Models from Basel and The Netherlands were validated against repeated 24 h outdoor measurements. Structure and model R(2) of local models were similar within, but varied between areas (e.g., 38-43% Turin; 25-31% Sabadell). Robustness of predictions within areas was high (ICC 0.73-0.98). External validation R(2) was 53% in Basel and 50% in The Netherlands. Combined area models were robust (ICC 0.93-1.00) and explained UFP variation almost equally well as local models. In conclusion, robust UFP LUR models could be developed on short-term monitoring, explaining around 50% of spatial variance in longer-term measurements.

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