

SPATIO-TEMPORAL VARIATION OF PARTICLE NUMBER CONCENTRATIONS IN A SWISS URBAN CITY

Harish C. Phuleria, *Swiss Tropical and Public Health Institute, Basel, Switzerland - University of Basel, Switzerland*

Ming E. Tsai, *Swiss Tropical and Public Health Institute, Basel, Switzerland - University of Basel, Switzerland*

Elisabetta Corradi, *Swiss Tropical and Public Health Institute, Basel, Switzerland, - University of Basel, Switzerland*

Nino Künzli, *Swiss Tropical and Public Health Institute, Basel, Switzerland, - University of Basel, Switzerland*

L.-J. Sally Liu, *Swiss Tropical and Public Health Institute, Basel, Switzerland, - University of Basel, Switzerland, - University of Washington, Seattle, USA*

Background and Aims: This study is part of the Swiss Cohort Study on Air Pollution and Lung and Heart Diseases in Adults (SAPALDIA), a nearly 20-year old cohort study spread in 8 geographically diverse areas in Switzerland. Innovative exposure modeling has been conducted in SAPALDIA earlier for PM_{10} and NO_2 , however, exposure to specific traffic related pollutants such as ultrafine particles and PM constituents has not been assessed. The overarching aim is to provide the estimates of individual long-term outdoor traffic-related air pollution exposures of the cohort participants. This paper focuses on the spatial and temporal variation of home outdoor particle number concentration (PN) in one of the SAPALDIA area, Basel.

Methods: The PN measurements will be conducted at 20 residences each in four of the eight areas in three seasons over a period of 2 years, 2011-2012. Indoors and outdoors monitoring will be conducted biweekly for $PM_{2.5}$, PM_{10} , NO_2 and weekly for PN. Particle counts are measured using a particle counting device, miniDiSC (miniature diffusion size classifier). It is a portable device and measures nanometer sized (10-300nm) particles with a resolution of one second.

Results: Mean weekly averaged PN levels are observed 14529 ± 3296 , 13659 ± 1878 and 11545 particles/cm³ at street, urban and regional background locations respectively. Median correlation coefficient for all sites is 0.70 (range 0.36-0.91) and 0.83 (range 0.39-0.99) for hourly and daily PN respectively. Median coefficient of divergence, a measure of spatial heterogeneity, for all site pairs is 0.15 (range 0.05-0.27), showing a low to mid spatial heterogeneity in daily PN in Basel. These winter season observations will be compared across seasons and further with concurrent $PM_{2.5}$, PM_{10} and NO_2 measurements.

Conclusions: Our first results show significant differences in PN levels in home outdoor locations and document the differential impact of traffic on PN levels in the city.