

Short-term urban and residential monitoring of UFP concentration and size distribution

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As part of the Interreg IVB North-West Europe Joaquin project (www.joaquin.eu) UFP measurements are initiated in the studied regions. Studies have shown that concentrations of UFP are elevated near roads but then decrease to near urban background within several hundred meters primarily as a result of dilution and partly by coagulation. The factors that impact the magnitude and extent of these gradients include traffic conditions, temperature, relative humidity, wind direction and speed, atmospheric stability, and mixing height. Measurements of UFP number concentration at a single monitoring station may not be indicative of actual human exposure in the communities surrounding the station. Due to their short atmospheric lifetimes and strong dependence on very local sources, particle number concentrations may vary significantly on very short spatial and temporal scales. In order to address this problem and to estimate more accurately human exposure and the subsequent health impacts of UFP, more intensive particle number measurements on finer spatial scales are needed.

We are interested in gaining a better understanding of the variance UFP levels at the vicinity of a major traffic road. The specific goals of this study are: (1) to determine the fine-scale spatial variability of particle number concentrations within a small area; (2) to determine the effects of a busy traffic road on particle number, size distributions and NO_x (passive samplers) into adjacent neighborhoods; (3) to analyze highly time-resolved particle number data using several statistical techniques in order to determine regional vs. local contributions to particle number levels; and (4) to examine how the variability of particle number concentrations within an area is affected by the site location (source vs. receptor).

Short-term (4 weeks) monitoring of UFP concentration was conducted simultaneously at four locations with different traffic intensities and at three sampling points at increasing distance to a busy road.

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