Particle Distribution and Its Relation to Trace Gases as Indicators of Traffic Emissions

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Abstract

In recent years, ultrafine particles have become of great concern due to their adverse health effects. Studies have indicated that the negative impact increases with decreasing particle diameter. Smaller particles have a greater tendency to become trapped in the lungs and will penetrate into surface tissues of the lungs more readily than larger particles.

Within the GÖTE - measurement project air masses adjacent to a busy road have been characterized, with a particular emphasis on the contribution of particulate matter from traffic. The characterization was conducted by continuously measuring concentrations of NO, NO_2, SO_2 and O_3 as well as particle concentration and size distribution (10-368 nm). The particle concentration and size distribution were obtained by utilizing a DMPS system, where particles are separated depending on their ability to traverse an electric field. Particulate matter was collected and the concentrations were quantified using X-ray spectroscopy. The size ranges for this analysis was 2.5-10 μm, <2.5 μm, <250 nm and <60 nm.

The concentrations of gases and particulates were compared to measurements of wind speed and direction and traffic intensity on the road. Relations between trace gases and particles were sought. A Principal Component Analysis (PCA) was performed, giving three factors explaining the particle size distribution (10-368 nm). The traffic, wind and trace gas data were used to characterize the factors. Typical number and mass spectra was calculated for these factors.

-The presentation will be in English
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