

Intermodal fraction of aerosol from indoor and outdoor microenvironments

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Coarse and fine particles overlap in a particle size interval between 1 μm and 2.5 μm (aerodynamic diameter). Since this interval appears between the accumulation and coarse mode it is called intermodal fraction (PM_{2.5-1}). Sources of both coarse and fine aerosols contribute to intermodal fraction to a certain extent and the contributions of individual sources may vary under different meteorological and/or spatial conditions. According to several studies, intermodal fraction correlates more with coarse aerosol during higher wind velocities and windstorms in arid regions (Kegler *et al.*, 2010, Claiborn *et al.*, 2011). In contrast, other studies have shown ambiguous or different results (Jalava *et al.*, 2006, Geller *et al.*, 2012). Intermodal fraction has not been so far investigated sufficiently.

Concentrations of size-resolved PM were monitored indoors and outdoors by a low volume (9 litres per minute) Personal Cascade Impactor Sampler (PCIS) with 5 stages A to F (A: 2.5-10 μm ; B: 1.0-2.5 μm ; C: 0.5-1.0 μm ; D: 0.25-0.5 μm ; and F-backup <0.25 μm) during various seasons in three different urban and rural locations. Basic meteorological parameters (temperature, relative humidity, wind velocity) were monitored as well. Presence of persons in the buildings was recorded in a diary.

Generally, outdoor and indoor concentrations of PM_{2.5-1} correlated strongly with coarse aerosol.

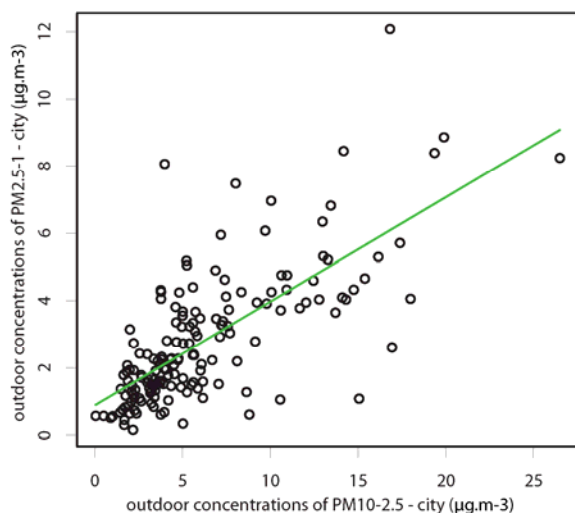


Figure 1. The association between outdoor concentrations of coarse aerosol and PM_{2.5-1} in Prague.

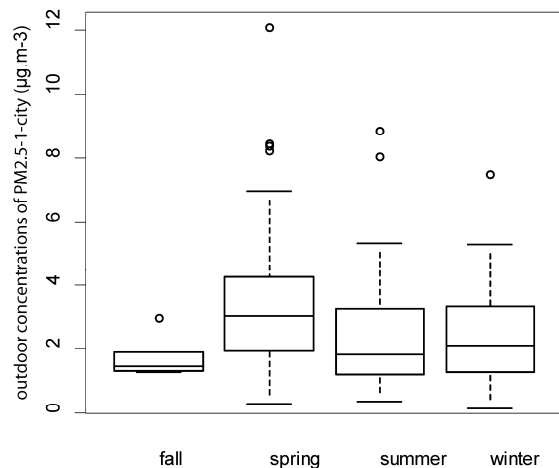


Figure 2. Comparison of outdoor concentrations in different seasons in Prague.

Correlation between the intermodal and fine fraction (PM₁) was also documented, however, it was much lower than the above mentioned coarse-intermodal association. In the indoor environment, the intermodal fraction was also associated with the number of persons present indoors.

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