

Spatial and indoor/outdoor gradients in urban concentrations of PM_{2.5} mass and ultrafine particles

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The SUPERSITE Project, financed and realized by Regione Emilia-Romagna and ARPA-ER, aims at better understanding the sources of the aerosol atmospheric pollution and its connection with human exposure and health. The WorkPackage 5 is focused on the study of the spatio-temporal variability of the relationship between indoor and outdoor (I/O) particulate air pollution in urban settings and aims at studying I/O pollution differences between (i) residential and trafficked areas, (ii) front and back on the same building, (iii) seasons in the year, (iv) different floors of the same building.

Here we present some preliminary results of the WP5, with a focus on the experiment conducted to compare I/O ratios of particulate in two similar unoccupied buildings with very different proximity to traffic. Measurements were made of I/O concentrations of PM_{2.5} and ultrafine particle (UFP, < 100 nm) number size distributions. Much larger spatial variability was found in the concentrations of UFP compared to PM_{2.5}. Mean indoor concentrations at the traffic site were higher than outdoor concentrations at the residential site. Significant differences were found for the shape of particle size distributions for outdoor particles while indoor particles showed very similar distributions. We observed a selective loss of particles in the indoor atmosphere in the size range below 50 nm, in comparison to coarser particles. I/O ratios for PM_{2.5} were higher than for UFP at both sites. Our findings represent a contribution to understanding the appropriate data to be collected in epidemiological studies on air pollution.

