

**WIND TUNNEL STUDIES OF LINE-AVERAGED AND POINT CONCENTRATION  
FLUCTUATIONS IN A STREET CANYON**

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The original aim of the project, of which this wind tunnel work formed a part, was to understand the performance of instruments that measure line-integrated concentrations, in situations with significant levels of concentration fluctuation, such as across a street canyon. A pair of Cambustion Fast Flame Ionisation Detectors was used to investigate the concentration field due to a line source in a 1:200 scale model of Martinistraße and its environs, Bremen, for a number of wind directions. Fluctuations in concentration levels at a point, the spatial correlation of concentration fluctuations and their variation with instrument sampling time were studied. Correlation techniques were applied to the raw data to obtain mean and fluctuating line-integrated concentrations as a function of the instrument averaging period. The results of this work proved to be of both generic and fundamental value, answering the specific questions addressed and providing new insights into the structure of concentration fluctuations in street canyons. For example, the maintenance of a positive, albeit small, correlation between concentrations on opposite sides of a canyon can be interpreted in terms of bulk motions. The intensity of the line averaged concentration fluctuations in the raw 200Hz data lay in the range from about 40 to 60% of the mean line integrated concentration, whereas equivalent results lat a point lay in the range from about 90 to 150% of the local mean concentration. The intensity of the line averaged concentration fluctuations decreased rapidly with block averaging of the raw data. The results were finally extrapolated to a 30s averaging time (approximately 30 minutes at full scale), which then gave line averaged concentration fluctuations in the range from 4 to 10% of the mean.

**EXTENDED ABSTRACT NOT SUPPLIED**