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Measurements of PM2.5 concentration by bike in the downtown of Budapest, Hungary

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There is an increasing interest to the exposure to atmospheric air pollution while commuting in urban areas. Cycling is an active transportation mode, which has significant health benefits. However, cyclists are at risk for exposure to traffic related air pollutants due to their proximity to motorized traffic and elevated respiratory rates. Because of their increased physical activity, the minute ventilation of cyclists can be 2-4 times higher than other commuters. Choice of a suitable route is a key factor to reduce the exposure of cyclists. Instead of high-traffic roads cyclists should choose an alternative, but maybe longer route, where the mean exposure can be lower.
The aim of the campaign is to map the average particulate matter (PM2.5) exposure on cycling lanes in the downtown of Budapest with a DustTrak TSI 8532 portable aerosol monitoring system and investigate the spatial variation of this pollutant in different urban environments, such as street canyons, urban green areas or high- and low traffic roads and bridges across the Danube River. The spatial distributions of the measured concentrations clearly show the impacts of roads, parks and the Danube River. Furthermore we have found some hot-spot areas, where we have measured peak concentrations due to the crossroads. Results show large spatial variability of concentration values, underlining the importance of car-free streets, urban vegetation and the good ventilation.
With this type of measurements we can define cycling routes with low concentrations and make a proposal to policymakers and city planners how to develop cycling infrastructure to make it healthier.