

CORRELATION BETWEEN SHORT-TERM MEASURES OF TRAFFIC NOISE AND PARTICLE NUMBER CONCENTRATION IN A SWISS URBAN CITY

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Background and Aims: This study is part of the Projet Tri-national Trafic, Air, Bruit et Santé (TRITABS), a tri-national study on traffic-related air pollution, noise and cardiovascular health. Disentangling cardiovascular effects of road traffic noise and air pollution require city-specific analyses, as their spatial distribution varies between cities. Moreover, traffic-specific air pollution and noise exposure models use similar traffic and land-use predictors, which may impede identification of the true relationship between the two. Our primary aim is to compare and contrast the spatial characteristics of traffic related air pollution and noise in Basel (CH), Grenoble (FR) and Girona (ES). This paper focuses on the spatial distribution of measured road traffic noise and particle number concentration (PN) in Basel.

Methods: Synchronized 15-minute measurements are being conducted at 60 locations in Basel for traffic volume, road traffic noise and PN. Measurements are done during non-rush traffic hours (9:30-16:00h) and repeated at least once at each of the locations. PN are measured using a miniDiSC (miniature diffusion size classifier), a portable device measuring nanometer sized (10-300nm) particles. Traffic-related noise is measured using a class 1 sound level meter, Pulsar 30. Detailed records of all non-traffic events during the measurements are made and excluded in the subsequent analysis.

Results: Mean PN and road traffic noise levels (as LAeq) are $24,180 \pm 13,949$ particle/cm³ (range, 5,232-51,387) and 57.2 \pm 8.6 dBA (range, 43.3-71.6) respectively. The observed PN-noise correlation is 0.73. Comparison of these short-term measurements to existing noise maps and concurrent weekly PN levels in Basel is underway. Local determinants of the spatial correlations will be further investigated, and compared within and across Basel, Girona and Grenoble.

Conclusions: Our first results show a high correlation between measured PN levels and road traffic noise in Basel, however, the validity of the same for longer time-windows is yet to be investigated.