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Road dust emission profiles and levels from paved road in Mediterranean and central European cities

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The burden of road dust re-suspension on urban air quality varies depending on several local factors such as precipitation rate, vehicle fleets and state of pavement. In Mediterranean cities emissions from traffic re-suspension can be comparable or even higher than direct exhaust emissions while in central Europe precipitation helps in maintaining street cleaning, reducing re-suspension. Receptor models are useful tools to estimate the contribution of urban re-suspension to PM. Target factor analysis and chemical mass balance can be successfully applied but a key task for the application of the aforementioned models is obtaining valid emission profiles for road dust re-suspended by traffic re-suspension.

In this study two different campaigns were carried out in Zurich (February 2008) and Barcelona (June 2007) in order to estimate the load and chemical properties of road dust in two dissimilar urban environments. To this aim 7 and 9 locations were selected in Zurich (CH) and Barcelona (E) city centers respectively. Samplings were performed by means of a field re-suspension chamber, collecting into filters the PM10 fraction of deposited materials from one square meter of active traffic lanes (Amato et al., 2009). The sampling sites selected for this study had different traffic loads (from background to major roads) allowing to evaluate the impact of traffic to the levels of pollutants, especially those from brake wear such as Sb, Cu, Zn, Ba, and Fe among others.

In Zurich the levels of deposited PM10 (0.2-1.3 mg/m2) were lower than in Barcelona (3.7-23.1 mg/m2) where levels were mainly controlled by the dust handling at kerbside works and uncovered transport by trucks. Such dust accretion, favoured by the lack of rain, increases re-suspension. This process is likely to be the main cause of the high atmospheric mineral matter in the urban background of Barcelona (31%), rather than in Zurich (10%) where PM10 mass is dominated by secondary inorganic aerosols (37%) and organic matter (20%). Moreover, the chemical characterization of samples allowed investigation of the sources responsible for dust and metals build-up

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