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FIELD AND CHAMBER STUDIES ON NATURAL PROCESSES OF AEROSOL FORMATION

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advanced  
atmospheric  
aerosol  
symposium

19-22 September 2010  
Florence, Italy

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## **Anthropogenic Influenced Mineral Dust Ambient Fine Particles At An Urban Site In Barcelona (Spain)**

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Mineral dust is a contributor of the global aerosol budget, with arid regions as principal sources. IPCC (2007) gives a best estimate of the direct mineral dust radiative forcing (RF), with the highest uncertainty in the radiative balance estimations being associated to mineral dust for both its direct and indirect effects. In addition, differentiating the anthropogenic influenced dust has important implications for health effects. Thus, several factors related to the estimation of mineral dust optical properties keep unresolved, including the anthropogenic contribution. The differentiation in the origin of the mineral dust burden is then urgent on the climate debate and a better understanding on the airborne dust properties is needed.

### **1. Scope and aims of the study**

The Saharan desert is a major source of mineral dust in the western Mediterranean cities although mineral dust from road resuspension, industrial and other human activities is also important. The dust load favours certain heterogeneous chemical reactions in the atmosphere, increasing the complexity of the urban aerosol picture.

The aim of this study was to improve the identification of anthropogenic dust in the PM<sub>2.5</sub> collected in Barcelona during the "Determination of the sources of atmospheric Aerosols in Urban and Rural Environments in the western Mediterranean" (DAURE) campaign. To achieve this purpose, samples for microscopy analysis were taken at different times of the day during a winter local episode in Barcelona (25-28 February 2009) dominated by atmospheric stability. The study focused on quantifying the diurnal variations of mineral dust range and associated properties such as size, morphology and chemical composition at an individual particle level by Computer Controlled Scanning Electron Microscopy and Energy Dispersive X-ray Spectroscopy techniques (CCSEM/EDS). Particles were firstly grouped into different clusters based on the elemental composition and secondly, on morphological basis. The abundance and size distributions of the different groups are explained in the discussion.