

ABSTRACT AAAR 2009

Investigation of sources of ambient submicron aerosol in the Barcelona metropolitan area using AMS mobile and stationary data

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The metropolitan area of Barcelona sees relatively high particulate matter (PM) levels when compared to other European regions (Pérez, 2008). A dry and warm Mediterranean climate, low dispersive conditions due to a unique topographical situation and high anthropogenic emissions contribute to the high PM levels. The 2009 DAURE Aerosol Winter Campaign (23-February-2009 to 27-March-2009) had an objective of characterizing the sources of fine and coarse aerosols in the Barcelona region, with particular attention to carbonaceous aerosols. An urban background and a rural background site were selected in order to characterize both urban and rural aerosols.

For the data presented here, two Aerodyne high-resolution time-of-flight aerosol mass spectrometers (AMS) (DeCarlo, 2006) were deployed together with additional instrumentation, one at the urban background site, the other in a mobile van allowing for on-road measurements and investigations into the spatial variability of aerosol concentration and composition. 4 different routes including downtown Barcelona, the harbour area, the heavily industrialized valley of Llobregat and the region of Valles/Montserrat were driven 2-5 times each. Results indicate that non-refractory-PM₁ mass measured at the urban fixed site is dominated by organic species. Organics showed significant contributions from

primary traffic sources and secondary sources, with less contribution from biomass burning.

Data from mobile measurements show that secondary organic aerosol makes up a significant fraction of PM1 mass in the whole Barcelona region. Local concentration peaks can most likely be attributed to primary emissions from traffic, biomass and waste burning, industry or ships.

Pérez, N., et al, (2008). *Atmos. Environ.*, 42: 1677-1691.

DeCarlo, P., et al. (2006). *Anal. Chem.*, 78, 8281-8289