



An Overview of the DAURE Campaign: Aerosols Emissions and Evolution in the Western Mediterranean Basin

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DAURE (Determination of the sources of atmospheric Aerosols in Urban and Rural Environments in the western Mediterranean) is a multidisciplinary international measurement campaign mainly aimed at estimating the sources and origin of atmospheric fine aerosols in the Western Mediterranean Basin (WMB), with particular attention to the carbonaceous fraction. Main focuses of the campaign are the study of the origin of the intense pollution episodes frequently occurring at regional scale in summer and winter in the WMB (Perez et al., 2008) and the emission, formation, transport and transformation of aerosols during these polluted scenarios. The peculiar atmospheric dynamics in the WMB, regulated by complex climatic and orographic effects (Millán et al., 1997), together with the large pollutant emissions from densely populated areas, large industrial areas and ports located along the coastline, give rise to a complex phenomenology for aerosol formation and transformation. In this context, extremely high concentrations of fine particulate matter (mainly PM₁, particulate matter with aerodynamic diameter < 1µm) are usually registered at regional background stations, with levels even higher than those simultaneously registered at urban stations. DAURE brings together state-of-the-art measurements and modeling techniques from about 20 International and Spanish Institutions. The DAURE campaign took place during winter (February-March 2009) and summer (July 2009) at an urban site (Barcelona, 80 m a.s.l., NE Spain) and a regional background site (Montseny, 720 m a.s.l., NE Spain, a Supersite of the EUSAAR network). Widespread in situ aerosol sampling techniques (such as PM optical counters, PM samplers, MAAP, CPC, SMPS, Rotating Drum Impactor, among others) and remote sensing techniques (LIDAR, sunphotometer) have been applied together with state-of-the-art methods such as 14C (Szidat et al., 2006), Proton-Transfer Reaction Mass Spectrometry (PTRMS) for VOCs, and High-Resolution Aerosol Mass Spectrometer (AMS) (DeCarlo et al., 2006). These state-of-the-art techniques have been applied for the first time in the Western Mediterranean region within DAURE. Particular attention was devoted to quantitatively understand the sources and formation mechanisms of secondary inorganic and organic aerosols (SIA and SOA) in the WMB and the effects caused by anthropogenic activities in SOA formation at local and regional level. Here we give an overview of the objective of the DAURE campaign, groups involved and measurements performed. The main results of the DAURE winter and summer campaigns will be presented and discussed. Temporal series and diurnal cycles of the detailed PM speciated data, gas-phase concentrations and meteorological data obtained at both Barcelona and Montseny stations will be presented and interpreted as a function of the different atmospheric scenarios observed during the DAURE campaigns.

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