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# Application of receptor modeling techniques (PMF2, ME-2, PCA) to rural and urban PM measurements performed during DAURE Campaign

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During the multidisciplinary DAURE (Determination of the sources of atmospheric Aerosols in Urban and Rural Environments in the western Mediterranean) measurement campaign (see Poster AS3.2#12025) a detailed chemical speciation of PM1, PM2.5 and PM10 was carried out at both urban (Barcelona, NE Spain) and rural background (Montseny, NE Spain) stations. PMx samples were simultaneously collected every 12 hours and chemical characterization comprised major and trace elements (about 40 species), organic carbon, elemental carbon, sulfate, nitrate, ammonium and chloride.

Jointly, additional data obtained by means of multiple aerosol monitoring techniques (such as MAAP, CPC, Proton-Transfer Reaction Mass Spectrometry (PTRMS) for VOCs, High-Resolution Aerosol Mass Spectrometer (AMS), among others) have been applied for a preliminary Principal Component Analysis together with PMx chemical speciation.

Standard Positive Matrix Factorization (PMF2) and enhanced factor analysis (Multilinear Engine ME-2) were applied with the aim of identifying the main sources affecting PM levels and estimating their contributions. ME-2 is a special purpose programming language (Paatero, 1999) permitting the solution to be guided toward some possible targets that can be derived from a priori knowledge of sources (chemical profile, ratios etc.). This feature makes it especially suitable for source apportionment studies where partial knowledge of the sources is available. Moreover specific physical constraints (mass conservation etc.), desired scales and bootstrapping can be implemented to the PMF problem.

The resolved source contributions will be compared with time-series contributions obtained in Barcelona and Montseny since 2003 in order to place the DAURE scenario within a multiyear frame. Special focus will be given to the PM1 pollution episodes registered at Montseny during DAURE campaign investigating the main sources and atmospheric processes controlling this scenario.

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