



Application of receptor modeling techniques (PMF2, ME-2) to rural and urban PM measurements performed during DAURE Campaign: Comparison with multiyear time series

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During the multidisciplinary DAURE field campaign (Determination of the sources of atmospheric Aerosols in Urban and Rural Environments in the western Mediterranean) (see overview presentation: Pandolfi et al., Session AS3.2) a detailed chemical speciation of PM₁, PM_{2.5} and PM₁₀ was carried out at both urban (Barcelona, NE Spain) and rural background (Montseny EUSAAR Supersite, NE Spain) stations. PM_x samples were simultaneously collected every 12 hours and analyzed for major and trace elements (about 40 species), organic carbon, elemental carbon, sulfate, nitrate, ammonium and chloride.

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 scripting language and weighed multilinear regression model solver (Paatero, 1999) permitting the solution to be guided toward some possible targets that can be derived from a priori knowledge of sources, in an completely flexible way (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 metrics 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 continuously since 2003 in order to place the DAURE period within a multiyear time 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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