

Study of Saharan dustfall in Southern Europe: preliminary results from the AIRUSE LIFE+ Project

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Atmospheric aerosols are of great concern because they can have negative effects both on environment and on human health. In Europe, the current policy efforts have not fully delivered the expected results and many urban areas still do not meet the air quality standards (2008/50/EC Directive). This is especially true for Southern Europe, where both anthropogenic and natural (Saharan dust, marine aerosols, etc.) sources give important contributions to particulate matter (PM).

The AIRUSE project, which involves public and private institutions of Spain, UK, Portugal, Italy and Greece, aims at testing existing and future mitigation measures and developing new strategies for the improvement of air quality in Southern European countries (www.airuse.eu). The project includes PM₁₀ and PM_{2.5} sampling in four urban sites in Barcelona (Spain), Athens (Greece), Porto (Portugal), and Florence (Italy), on a daily basis for long periods (about 1 year since January 2013) in order to get a time-extensive data set giving an overall representative picture of the PM composition in these urban sites. Further, the project includes sampling with hourly resolution and coarse/fine particles segregation for selected periods (a couple of weeks in wintertime and summertime). In fact, most particulate emissions as well as atmospheric transport and dilution processes change within a few hours and daily samples are not capable of tracking these rapid changes.

Both daily and hourly samples were analyzed by PIXE measurements for the simultaneous assessment of the concentration of all the elements $Z > 10$; PIXE is highly sensitive to most of the crustal markers (e.g. Al, Si, K, Ca, Ti, Fe, Sr...) and it is therefore an unrivalled technique for the analysis of the dust aerosol content.

Preliminary results focusing on the identification of Saharan dust advection episodes and their characterisation in terms of composition and impact on PM₁₀ and PM_{2.5} will be shown. Backtrajectory analysis was performed for all the period in order to strengthen the analysis.

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