Geochemical map for major and trace elements in PM10 of Andalusia (South of Spain)

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Tradicionally, geochemical maps are a powerful tool illustrating spatial variation patterns of geochemical componentes in rocks, sediments, soils and water. In this work we present geochemical maps of atmospheric particulate matter (PM10, particulate matter<10μm) to estimate the baseline and peak concentrations of chemical elements, which can provide relevant information for studies in air quality.

PM10 sampling was performed by using TISCH high volume samplers (68 m^3 h^{-1}) in 17 monitoring stations of the Air Quality Network of Andalusia. Quartz filters were used and one daily sample was collected per week during the year 2007 (670 samples). Monitoring stations are classified in rural, urban background, traffic hot-spot and urban-industrial, and are representative of the geography and climatology and of Andalusia.

Major and trace elements were analyzed using a consistent set of methods (ICP-OES, ICP-MS, Ion Chrmatography and Elemental analyzer for Ctotal). Annual mean and standard deviation of each element were calculated for each sampling sites, and were plotted in index maps.

PM10 shows complex variations in major and trace elements. A wide variety of sources as natural (resuspension, marine aerosol, North-African air masses outbreadks) and anthropogenic (traffic, industrial, vegetation fires) can influence the geochemical composition of PM10.

Relevant information is supplied by As, Ni, Pb and other toxic metals in the air. High concentrations in As and Se, Bi, Cu, Zn and Pb have been recorded in Western Andalusia, derived principally from Copper Smelter emissions, which have been previously described by other works (e.g. Querol *et al.* 2002)). Also is relevant the high concentration in Ni and V in Gibraltar Strait and Bailén city, which are attributed to petroleum refineries and ceramic factories, respectively.

[1] Querol *et al*. (2002). *Atmospheric Environment* **36**, 3113–3125.

Primary production of sea spray aerosol

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An accurate formulation of the sea spray source function is of great importance for assessment of their effects on a variety of processes, including effects on climate, air quality, atmopsheric chemistry and electro-optical observations. Traditionally studies on the production of sea spray aerosol were focused on the coarse fraction (r_{80}, the particle radius at relative humidity = 80%, greater than 1 μm), but in the last decade much interest has been raised in 0.1 – 1 μm particles because of their contribution to light scattering and in ultra fine particles because of their role as cloud condensation nuclei. An overview of the current knowledge on the primary production of sea spray aerosol and results from different techniques and experimental approaches are presented, recent experimental developments will be discussed. The sea spray source function has been extended to particles with r_{80} as small as 20 nm. The effect of water temperature on the sea spray source function has been evaluated and introduced in source function formulations. The effect of biological material on sea spray primary production and its composition as a function of particle size has been recognized. The application of micrometeorological techniques has advanced and when combined with volatility to selectively sample sea spray particles provides direct measurements of the fluxes. The development of a fast optical particle counter (10 Hz) is a major step forward in this respect.

[1] De Leeuw *et al.* (2009) 'Primary production of sea spray aerosol' (in prep.).