



## Atmospheric pollution in Lisbon urban atmosphere

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Lisbon is the capital city of Portugal with about 565,000 residents in 2008 and a population density of 6,600 inhabitants per square kilometre. Like several other major metropolis, the town is surrounded by satellite cities, forming together a region known as “Lisbon Metropolitan Area” with about 3 million inhabitants, a quarter of the overall Portuguese population.

Besides their local residents, it is estimated that more than one million citizens come into the Lisbon area every day from the outskirts, leading to elevated traffic densities and intense traffic jams, with important consequences on air pollution levels and obvious negative impacts on human health. Airborne particulate matter limit values are frequently exceeded, making urgent the existence of consistent programs to monitor and help taking measures to control them.

Within the Portuguese project PAHLIS (Polycyclic Aromatic Hydrocarbons Contamination in Lisbon Urban Atmosphere) financed by the Portuguese Science Foundation (“Fundação para a Ciência e a Tecnologia”), an aerosol and vapour phase sampling program is being implemented in the city of Lisbon at two selected contrasting zones, namely a typically busy area with intense road traffic and frequent exceedences of the particulate matter standard for the maximum allowable concentration, and a residential quieter area, thus with a cleaner atmosphere characterised as an urban background site.

An one month-long sampling campaign was performed during the summer of 2008, where particulate matter was collected in two fractions (coarse  $2.5\mu\text{m} < \text{Dp} < 10\mu\text{m}$  and fine  $\text{Dp} < 2.5\mu\text{m}$  fractions) in parallel on both quartz fibre and Nuclepore filters using respectively Hi-Vol and Gent type samplers.

A thermal-optical method was applied on a portion of the aerosol collected on the quartz filters to quantify black or elemental and organic carbon (EC/OC). Another portion of the quartz filters was Soxhlet extracted with dichloromethane and the resulting extracts fractionated by flash chromatography prior to gas chromatography-mass spectrometry (GC-MS) analysis regarding their organic content.

The inorganic content of particulate matter collected on Nuclepore filters was studied both by cationic and anionic chromatography to monitor their water soluble composition and by PIXE (Proton Induced X-ray Emission) considering their metal content.

In this communication, the results of both organic and inorganic analyses of aerosol samples from these two sites will be presented, compared and discussed.

Results of this work are expected to cover a lack of reliable information regarding sources of atmospheric pollutants in Portugal and present, for the first time, systematic data of PAHs levels in Lisbon.

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