

DEVELOPMENT OF A COST EFFICIENT POLICY TOOL FOR THE REDUCTION OF ATMOSPHERIC PARTICULATE MATTER IN GREEK URBAN CENTRES

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EXTENDED ABSTRACT

This work aims to provide a comprehensive characterization of the PM pollution problem in three Greek big urban centres (Athens, Thessaloniki and Volos), with the final objective to assist the national and regional authorities to develop and implement appropriate control measures. PM measurement and chemical speciation campaigns have been conducted during warm and cold period of 2011 – 2012 at the three areas. The results obtained have been combined with relevant historical data, with the final objective to compile a detailed database on PM₁₀ and PM_{2.5} concentration levels and chemical composition and to analyze trends over the last 10 years. At a second stage source apportionment models have been applied to both old and new data, in order to identify the main sources responsible for the increased levels observed and to quantify their relative contribution. In addition, detailed emission inventories for natural and anthropogenic sources have been developed for all three areas.

Analysis of the study campaigns and historical data has revealed a clear decreasing trend in both PM₁₀ and PM_{2.5} concentrations over the last 10 years. Nevertheless, significant levels and frequent exceedances of the E.U. air quality limit values have been observed in traffic sites during warm season and in all sites during cold season, indicating the effect of central heating and possibly the intensive use of household fireplaces during the winter months of 2011 - 2012. The results obtained by source apportionment models and emission inventories suggest that traffic and industrial activities remain the main anthropogenic sources, with the latter more pronounced in Thessaloniki and Volos. Nevertheless, contribution from natural sources as well, such as sea salt and soil dust, emitted though regional circulation of air or long-range-transport, is not negligible.

All the above results have been integrated in a comprehensive database which provides an insight into the environmental problem targeted. The final stage of the study involves the development of a cost efficient policy tool which evaluates emission trends and source strength data and associates them with observed PM concentration levels. It thus allows for assessment of the impact of control measures on observed ambient PM levels.

Keywords: PM₁₀/PM_{2.5}, chemical characterization, source apportionment, emission inventories, urban centers, mitigation measures, policy tool.

associates emissions to sources identified by receptor modelling and to ambient concentration levels. End-users may create specific emission scenarios and calculate the corresponding ambient PM levels. The Policy tool is expected to assist towards the development of effective environmental policies, by indicating the exact and detailed measures leading to PM concentration reductions, for each source category. The study's final objective is to promote the use of this tool by the national authorities, for the identification of the optimum emission reductions and measures, and for the development of cost efficient and sustainable air quality strategies.

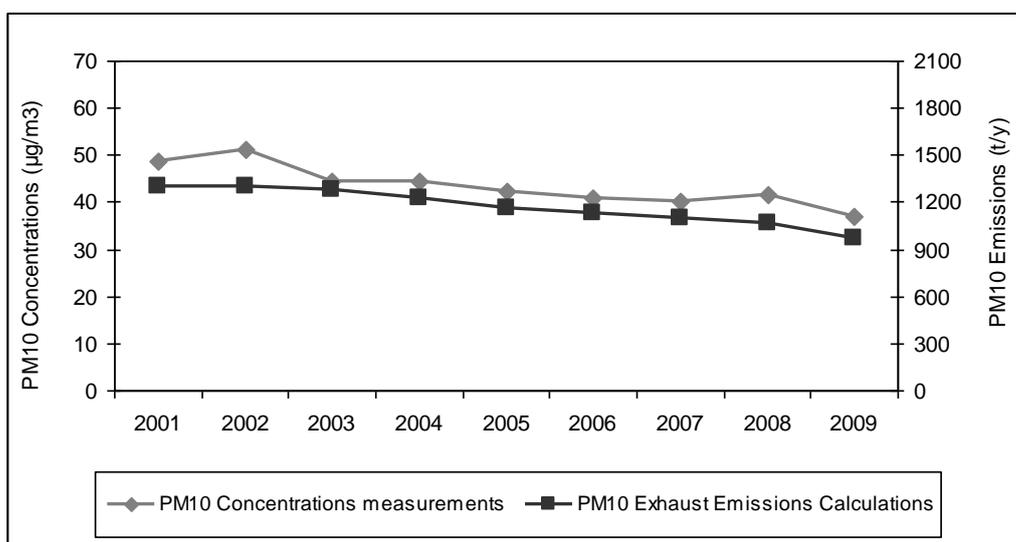


Figure 5. PM₁₀ ambient concentrations measured by the NAPMN and respective estimated traffic emissions (only exhaust).

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