



Greater Athens PM pollution: Local or regional origin;

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During the last decades, the Particulate Matter (PM) pollution has become one of most challenging environmental problems worldwide. Along with their impact on global climate change and ecosystems, particles, especially for the smaller one, are indicated by numerous epidemiological studies to pose a great risk to human health with acute or long-term effects. Being located at the intersection of air masses circulating among three continents, the Mediterranean Basin is one of the areas heavily affected by aerosols with both natural and anthropogenic origin. Furthermore, the complex prevailing meteorology favours the aging of polluted air masses and induces high level of PM and photooxidant gases.

In line with such scientific demands, the aim of the specific work is to elucidate the main characteristics of PM_{2.5} and PM₁ nature (mass and chemical composition (Cl⁻, SO₂, K⁺, Mg²⁺, Ca²⁺, OC, EC)) of the Greater Athens Area (GAA) to elucidate the factors controlling the PM pollution and enable the policy makers to develop effective air quality remediation plans. Taking into consideration that PM measured at a specific site is the result of combined features and processes, at a local or a larger scale, as well as the air quality degradation by particulate matter over polluted areas which is often characterized by high levels of regional background aerosols, the main goal of this study is the identification and estimation of the local or regional contribution to the PM burden at GAA during different meteorological driven scenarios. Focusing on the changes in the prevailing atmospheric circulation patterns (mesoscale/synoptic wind regimes), a mass closure study of the available chemical species in conjunction with the observed PM mass is also attempted, in order to differentiate the relative contributions of the constituents. Special attention is also given to the high PM concentration (exceedances) days.

The experimental campaign was held in parallel, during the period of 2008, at three sites of GAA. The monitoring stations were selected and positioned carefully, along the central axis (S-N) of the GAA representing rural background, roadside-industrialized and coastal/rural background locations. Our results indicate a significant contribution of regional pollution on PM levels measured at GAA.