

Chemical composition and sources of ambient aerosol in an urban environment over Athens, Greece: Case study on the role of wintertime biomass burning

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Abstract This study examines the chemical composition of aerosols over the Greater Athens Area (GAA). To achieve this, particulate matter sampling has been conducted on a 6h-24h basis and more than 700 aerosol samples were collected at downtown Athens, in Thessio from January 2013 to December 2015. All samples, after mass quantification, were analyzed for major anions (Cl^- , Br^- , NO_3^- , SO_4^{2-} , PO_4^{3-} , $\text{C}_2\text{O}_4^{2-}$), cations (NH_4^+ , K^+ , Na^+ , Mg^{+2} , Ca^{+2}), trace elements (Al, As, Ca, Cd, Co, Cr, Cu, Fe, V, Zn, Mn, Ni, Pb, P, S, Sb), organic carbon (OC) and elemental carbon (EC). Aerosol chemical mass closure calculations indicated that carbonaceous aerosol constitutes a major component, along with nitrate and sulfate anions, dust, cations and EC.

Moreover, during the winter periods of December 2012-January 2013 and December 2013-January 2014, air pollution due to excessive use of biomass for domestic heating has been reported as a major environmental problem in the area. To assess the importance of biomass burning as a source of air pollution over the GAA three main sugars specific biomass burning tracers (levoglucosan, mannosan and galactosan) and Polycyclic aromatic hydrocarbons (PAHs) were also analyzed during the winter period.

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