

# Source Apportionment of Carbonaceous Aerosols in an Eastern Mediterranean Megacity, Istanbul: Insights from Radiocarbon Measurements

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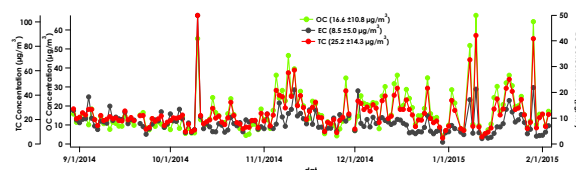
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Being one of the most populated megacities in eastern Mediterranean, Istanbul is under various environmental pressures including atmospheric pollution. An intensive field campaign so called TRANSEMED-Istanbul (Transport Emissions and Mitigation in the East Mediterranean with a focus in Istanbul) was performed in Istanbul between August 2014 and February 2015. Gaseous organic (VOCs) and inorganic ( $O_3$ ,  $NO_x$ ) pollutants were monitored in-situ with high time resolution while daily particulate matter (PM) samples were collected. Collected samples were analyzed in terms of EC and OC by means of Thermal Optical method. In addition, biomass and fossil origins of the PM was distinguished quantitatively using radiocarbon as a tracer. To end this, the selected samples were analyzed by Accelerator Mass Spectrometry (AMS) in terms of  $^{14}C$  as detailed in Zhang et al. (2012).

The evolution of EC, OC and TC in  $PM_{10}$  size fraction during the field campaign was illustrated in Figure 1. Average EC, OC and TC concentrations were measured respectively as  $8.5 \pm 5.0$ ,  $16.6 \pm 10.8$  and  $25.2 \pm 14.3 \mu g m^{-3}$  while  $PM_{10}$  mass concentrations was determined as  $50 \mu g m^{-3}$  on average. Comparison of the obtained results with the previous study performed in Istanbul revealed that measured OC concentration in this study is almost three times higher than one found by Theodosi et al. (2010). Radiocarbon analysis results indicated that

fossil fuel combustion is the dominant source determining the levels of carbonaceous aerosols over Istanbul megacity.



**Figure 1.** Temporal variation of carbonaceous concentrations

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