

CARBON MASS CONCENTRATIONS IN SOUTHERN ZAGREB DURING A FIVE-YEAR PERIOD

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The purpose of this study was to see how the mass concentrations of elemental and organic carbon change during the seasons and whether they change over a longer period of measurement. The sampling station was located on the roof of the Siget Medical Centre in the southern part of Zagreb. This site, defined as an urban monitoring station, is burdened with heavy traffic and is close to offices and schools.

Samples of PM₁₀ particle fraction were collected from approximately 55 m³ of air on quartz fiber filters (Pallflex Tissuequartz 2500QAT UP, Pall Life Sciences), pre-fired at 900 °C for three hours. Sven Leckel LVS3 (*Sven Leck Ingenierbüro*, Berlin, Germany) reference samplers were used for sample collection and PM₁₀ mass concentrations were determined gravimetrically according to the HRN EN 12341 standard. Organic carbon (OC) and elemental carbon (EC) in PM₁₀ fraction were determined by the thermal-optical transmittance method (TOT), using a Carbon Aerosol Analyzer (Sunset Laboratory Inc.) with a FID flame ionization detector following a NIOSH-like protocol called Quartz (Birch and Cary, 1996, Quincey et al., 2009, Godec et al., 2012). Sampling was conducted from 2 January 2009 to 31 December 2013.

A slight negative trend of PM₁₀ mass concentrations was noticed during the five-year period. Mean mass concentrations of EC and OC for all five years were 2.34 µg m⁻³ and 11.4 µg m⁻³, respectively. Yearly mean mass concentrations of OC followed the sequence: 2010 > 2009 > 2012 > 2013 > 2011. The lowest daily measured concentration of EC was recorded in 2012 and was 0.26 µg m⁻³. The OC/EC ratio for all five years was 5.2, which indicated a presence of secondary OC in this part of Zagreb. The lowest daily OC/EC ratio was recorded in 2009 and was 1.1, which indicated only the presence of primary OC in the air during that day. Mass concentrations of PM₁₀ and OC as well as OC/EC ratio followed the sequence: winter > autumn > spring > summer. The highest EC mass concentration was recorded during autumn, while the lowest during spring. Average EC and OC contributions to PM₁₀ mass were 7 % and 26 %, respectively. The highest OC contribution to PM₁₀ mass was recorded during autumn, while the lowest EC contribution to PM₁₀ mass was recorded during winter.

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