

Results of the first EC/OC intercomparison exercise for National Air Quality Reference Laboratories

L. Emblico and A. Borowiak

Joint Research Centre, Institute for Environment and Sustainability, 21027 Ispra (VA), Italy

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Fine particulate matter is a pollutant of increasing concern due to its role in health effects (Pope et al, 2002) and impact on climate change (Seinfeld and Pandis, 1998). The Air Quality Directive 2008/50/EC, published in June 2008, reflects this increased concern and regulates as a novelty ambient air concentrations of fine particulate matter PM_{2.5}. The novelties around the PM_{2.5} regulation are three fold: an exposure reduction target, a limit value (applicable from 2015 onwards) and the chemical speciation of PM_{2.5} at urban background sites to provide information on the content of cations, anions, elemental carbon (EC) and organic carbon (OC).

The Joint Research Centre of the European Commission, Institute for Environment and Sustainability, is running the "European Reference Laboratory for Air Pollution (ERLAP)", being the Commission's responsible body for organizing Community quality assurance programmes. ERLAP has been organizing already on a regular basis or on demand intercomparison exercises for inorganic and organic air pollutants, and heavy metals in PM (Gerboles and Buzica, 2008). In order to prepare the Community for the new challenge on PM speciation, ERLAP organized a first EC/OC intercomparison exercise within the AQUILA Network of National Air Quality Reference Laboratories during autumn 2008. Aim of the study was to assess the comparability and quality of TC (total carbon), OC and EC measurements among AQUILA laboratories and to quantify differences in the results. Since no common analytical protocol is currently available for EC/OC determination, each participant was requested to perform the analysis using his own standard procedure.

Filters (diameter 150 mm) have been sampled with a High Volume PM Samplers at three different sites: Ispra (rural background site), Vienna and Essen (urban background sites). 14 punches (including one blank) of 4 cm² have been sent to each of the 16 participating laboratories. Most of the laboratories measured the punches by means of thermo-optical analysis, but using different protocols: NIOSH (NMAM 5040) or similar, and EUSAAR (Cavalli and Putaud, 2008).

First results show that, regardless of sample origin or TC filter loading, a good agreement is found for TC

measurements (r.s.d. below 10%), but discrepancies up to 40% were reported on EC measurements.

As one error source filter inhomogeneity has been identified: punches taken close to the filter edge are less homogeneous in carbon content with respect to punches taken in the central part of the filter. Nevertheless, EC data provided by laboratories using the same protocol are in excellent agreement (r.s.d about 10%).

The statistical data treatment of the results will be presented, to quantify differences between analytical protocols, repeatability and reproducibility of measurements and the capacity to meet the data quality objective required by the Air Quality Directive.

AQUILA Network: <http://ies.jrc.ec.europa.eu/aquila-homepage.html>

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