



International Seminar on Air Pollution and Respiratory Diseases

Black carbon: does it really matter?

Giovanni Invernizzi¹, Ario Ruprecht¹, Paolo Paredi^{1,6}, Cinzia De Marco¹, Giuseppina Tosti², Bruno Villavecchia², Grisa Mocnik³, Constantinos Sioutas⁴, Dane Westerdahl⁵, Silvia Moroni², 1 SIMG - Italian College GPs, Florence, Italy. 2 AMAT - Mobility, Environmental and Land Agency, Milan, Italy. 3 Aerosol d.o.o., Ljubljana, Slovenia. 4 University of Southern California, Los Angeles, CA, USA. 5 Cornell University, Ithaca, NY, USA. 6 Brompton Hospital, London, UK

Background: Many epidemiological studies are based on PM_{2.5} and/or PM₁₀ mass measurements since most of PM pollution is generated by combustion processes and presents a relatively high degree of spatial uniformity. However several studies have shown considerable difference in PM oxidative properties in different European Cities^{1,2} demonstrating clear location-dependent differences in PM composition. Evident need of additional new metric of real time PM monitoring. Black Carbon (BC) measurement can be considered as an important additional metric as demonstrated by several studies and WHO^{3,4}.

Method of BC measurements:

BC measurement based on light attenuation at different wavelength (from 370 to 990 nanometers) of PM accumulated on filter. Comparison of different methods. Advantages and disadvantages of BC realtime measurements and problems. Future researches on the subject.

Our experience:

using models AE51 and AE31 of Magee Scientific (USA). *Last Supper of Leonardo Da Vinci*⁵: one year indoor/outdoor continuous PM sampling and realtime measurements: BC mean indoor < 0.05 µg/m³ with 3% I/O ratio. *Ecopass Milan (Low Emission Zone, LEZ)*⁶: BC contribution to PM₁₀ decreased by 47% and 62% in Ecopass zone and pedestrian zone respectively, as compared to no-restriction zone. *AREA C LEZ Milan*⁷: BC/PM₁₀ and BC/PM_{2.5} ratios were 50% and 59% lower inside 'Area C' LEZ. No changes in PM₁₀ and PM_{2.5} concentrations. Personal exposure to BC concentrations reduced to - 43% inside 'Area C' LEZ and to - 59% in Pedestrian Area. *Outdoor SHS Pollution*. BC measurements can detect Second Hand Smoke (SHS) outdoor better than PM; examples in stadium, beaches, city parks and pedestrian areas.

Conclusion: significant difference in BC concentrations inside Milan LEZ, with improvement of one to three BC epidemiological 'change units', a remarkable reduction in particulate toxicity and related expected mortality and morbidity (Janssen *et al.*, 2011) for living population and city users.

References

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- 4.-WHO, 2012: *Health effects of Black Carbon*, <http://www.euro.who.int>, ISBN: 978 92 890 0265 3
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