



# EuNetAir Newsletter

COST Action TD1105 Iss. 3/Dec. 2013

## Editorial

M. Penza

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This 3rd issue of Newsletter covers the Action grant period June-December 2013 to disseminate the networking activities and current research results in environmental science and technology from COST Action TD1105 ([www.cost.eunetair.it](http://www.cost.eunetair.it)) European Network on New Sensing Technologies for Air-Pollution Control and Environmental Sustainability - EuNetAir, edited half-yearly in the next four years (2012-2016) by an Editorial Board, chaired by Prof. Ralf Moos (University of Bayreuth, DE) with Editorial Board Manager Daniela Schönauer-Kamin (University of Bayreuth, DE).

The excellent teams of over 170 involved international experts such as scientists, researchers, technologists, modellers, SMEs managers from 28 COST Countries, 4 International Partner Countries (IPCs) and 3 Near Neighbour Countries (NNC) are working hard to contribute to the objectives and work plan of COST Action TD1105 in the air quality monitoring including environmental technologies, nanomaterials, gas sensors, smart systems, air-pollution modelling, measurements, methods, standards and protocols.

The concerted COST Action TD1105 is very pleased to present the networking/dissemination results of the national/international research from Action partnership to various international conferences/workshops such as 1st International Workshop on New Sensing Technologies and Transducers for Air-Quality Monitoring (June 20, 2013, Barcelona, Spain) as open satellite workshop to Transducers 2013 - Eurosensors



XXVII and WG1-WG4 Meeting on New Sensing Technologies and Methods for Air-Pollution Monitoring (European Environment Agency, October 3-4, 2013, Copenhagen, Denmark). In these two meetings, over 80 Participants from at least 25 COST Countries were involved with a large participation and target audience. In this Newsletter we will give an update on the outcome of these workshops.

Special acknowledgements to the COST Office Director (Dr. Monica Dietl) for her Letter of Support



received and read to the EEA meeting in Copenhagen. Many thanks for sharing the prestigious inputs on networking and "common brains" community to generate new knowledge for science, technology and innovation.

The COST Action TD1105 will hold the 2nd Scientific Meeting including Working Groups Meeting and 4th Management Committee Meeting at Queens' College, University of Cambridge, Cambridge (UK), December 18-20, 2013. The 3rd Management Committee Meeting of EuNetAir was held

at IREC in Barcelona (Spain), June 21, 2013. This 3rd MCM decided to elect a new Grant Holder (GH) as Eurice GmbH, Saarbrücken (Germany). Special thanks to the old GH as University of Bari, Bari (Italy).

The First Training School of EuNetAir on Environmental Technologies and Air-Quality Monitoring was held at University of Barcelona, Electronics Department,



Barcelona (Spain), June 13-15, 2013, with 39 trainees and 9 trainers from at least 20 COST Countries. This event was labelled as Green Week 2013 Satellite, by DG ENV.

EuNetAir supported 11 Short Term Scientific Missions (STSMs) in the Year 1 (July 1, 2012 – June 30, 2013) for visit and exchange of motivated Early Stage Researchers and experienced scientists from a laboratory to another one in order to start and consolidate new international research collaborations in the whole area of EuNetAir topics.

Finally, EuNetAir, represented by Action Chair, participated to the COST Annual Progress Meeting in Hannover (Germany), June 12-13, 2013, to report on progress of the Action TD1105 activities to the ESSEM Committee related to the first grant period (July 1, 2012 – June 30, 2013). The feedback from other Action Chairs and DC Rapporteur was highly positive and encouraging. On behalf of Action Management Committee, I would like to thank ALL Action participants for their valuable scientific work, kind availability and great enthusiasm that will make our Action very successful as an excellent S&T platform to address the upcoming Horizon 2020!

## Overview on EuNetAir Events

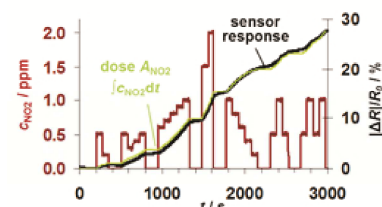
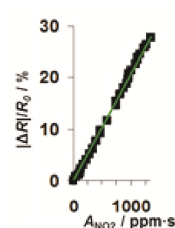
### Conductometric Gas Dosimeters for NO<sub>2</sub> Detection

I. Marr, A. Groß, R. Moos

Gas sensors working in the accumulating mode are suitable for the direct determination of the analyte dose or the mean concentration in a defined period of time and the long-term detection of lowest analyte concentrations. The sensitive materials are able to change at least one electrical property by the selective accumulation of analyte molecules. During the sorption phase, the irreversible analyte accumulation can be caused either by a chemical reaction or a strong analyte sorption between the analyte molecules and the sensitive material. In case of a limited sorption rate of the sensing material or deterioration of the sensing characteristic caused by saturation effects, regeneration has to be conducted.

The dosimeter principle was exemplarily investigated for a carbonate-based NO<sub>x</sub> storing material. Due to nitrate formation, a resistance change can be measured. The sensor response,

$|\Delta R|/R_0$ , follows the characteristic behavior of a gas dosimeter with a concentration-dependent slope during exposure to NO<sub>2</sub> and remains at its level in absence of NO<sub>2</sub>. The time integral of the concentration,  $\int c_{\text{NO}_2}(t)dt$ ,



reflects the course of the accumulated NO<sub>2</sub> amount (dose), being in accordance with the course sensor signal.

The characteristic line gives a linear correlation between  $|\Delta R|/R_0$  and the total NO<sub>2</sub> amount (dose)  $A_{\text{NO}_2}$  (b).

### The black carbon mapper: A platform to map black carbon exposure at street level with volunteers

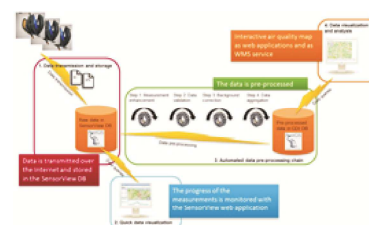
B. Ellen

Pedestrians and cyclists are exposed to traffic pollution while moving around in urban environments. Their level of exposure can differ significantly from street to street. Fixed monitoring networks are unable to measure this spatial variability. Mobile air quality measurements are required. Due to significant temporal variations in black carbon (BC) exposure levels, a large amount of repeated measurements is needed. This can be collected in a cost-effective way by cooperating with volunteers and city personnel.

The "Black Carbon Mapper" (BCM) is a platform developed by VITO to collect the required large amounts of mobile BC measurements and to process them into street-level BC exposure maps. It contains two parts: user friendly measurement

devices which allow city personnel and volunteers to collect mobile BC measurements, and an automated data processing infrastructure which constructs and updates the BC map. Processing steps include enhancement and validation of noisy second BC measurements and distorted GPS tracks, background correction and spatiotemporal data aggregation.

The BCM platform has been successfully tested in the cities of Antwerp and Ghent. It has proven to be a powerful platform which allows to get a detailed view on the street-level BC exposure of cyclists and pedestrians in urban environments.



### Geriatric study in Portugal on Health Effects of Air Quality in Elderly Care Centers

J.P.Teixeira

The study of indoor air quality in homes of elderly persons is becoming an important issue to be addressed by clinical research due to the rising percentage of adults aged 65 years and older and the amount of time they spent indoors. In fact, older persons may be particularly at risk of detrimental effects from pollutants, even at low concentrations due to their common reduced immunological defense and multiple underlying chronic diseases.



In this sense, the GERIA Project (Geriatric study in Portugal on Health Effects of Air Quality in Elderly Care Centers) ([www.geria.webnode.com](http://www.geria.webnode.com)) assesses 20 elderly care centers (ECCs) chosen among 60 in Porto and Lisbon. This study will provide crucial information about ECCs construction characteristics, indoor environment and prevalence of cardio-respiratory diseases for older persons in Portugal. Our preliminary results point out that: (i) PM<sub>2.5</sub> are not within the reference levels; (ii) Prevalence of indoor sources for TVOC, Bacteria, CO and CO<sub>2</sub> in both seasons; (iii) Season significant differences for PM<sub>10</sub>, TVOC, Bacteria and CO<sub>2</sub>; (iv) Bacteria and CO<sub>2</sub> show significant differences between the diverse indoor analyzed areas; (v) Fungi samples raise concern showing incidence of *Aspergillus fumigatus* that can cause invasive lung infections in susceptible individuals as elderly. Ongoing analysis is focusing on the interaction between IAQ variables, building and ventilation characteristics, as well as, the health outcomes.



## EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

