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EDITORIAL

Biomonitoring of atmospheric pollution: possibilities and future challenges

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This special issue of Environmental Science and Pollution Research highlights selected papers presented at the Seventh International Workshop of BioMAP (BioMAP7), which is focused on biomonitoring of atmospheric pollution, and which was held on June 14–19, 2015, in Lisbon, Portugal.

The series of BioMAP workshops was initiated in 1997, emerged as an effective 3-annual platform for (academic) exchange, and was now held for the third time in Portugal, organized by the Centro de Ciências e Tecnologias Nucleares (Instituto Superior Técnico, Universidade de Lisboa). The workshop brings together both scientists, policy makers and other practitioners in environmental sciences from all over the world, to share answers and ideas and discuss the challenges that should be faced within the realm of atmospheric pollution.

There is an ever growing need for information within the context of possible health hazards due to environmental pollution. This information is necessary to improve air quality management. Biomonitoring is a sensitive, selective and user-friendly method of air quality monitoring, to be used in both ambient, indoor and working place conditions, and the relevant information may be deduced from either the abundance, the behaviour of the organisms, or from the presence of specific substances in the monitor tissues. Biomonitors may be applied both in in situ situations, as in surveys in which monitors are exposed that are transplanted from background level sites.

BioMAP7, in addition to the specific issues related to biomonitoring as a technique, specifically addressed the potential of biomonitoring in assessing human exposure to and effects of exposure to toxic substances: as it is, biomonitoring comprises interdisciplinary approaches, which need input from environmental, biological, chemico-analytical, data-analytical and medical-epidemiological domains.

This special issue cannot fully reflect the diversity and creativity of the ideas and new insights that were shared at BioMAP7. However, as editors, we hope that this issue may prompt scientists from the diverse fields to participate in BioMAP workshops to come: the collected papers show and justify the strong position of the biomonitoring technique in worldwide studies on atmospheric pollution.

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Dr. Marta Almeida is researcher at C^2TN, Instituto Superior Técnico, Universidade de Lisboa, Portugal. Over the last 15 years, Almeida has dedicated her research to the atmospheric chemistry. Her work showed that nuclear analytical techniques can be advantageously used in aerosol studies, and at the moment, the complete characterization of the particles at the receptor is used by the researcher to elucidate the sources of the pollutants and the processes associated with their formation, to assess local, regional and long-range transport and to identify mitigation options focusing on the improvement of the air quality. Almeida participated in 19 research projects, published 80 scientific papers and is a member of the international board of Biomonitoring of Atmospheric Pollution (BioMAP).

Dr. Bert Wolterbeek is full professor of Radiochemistry at the Faculty of Applied Sciences of the University of Technology, Delft (UTD), The Netherlands. He is head of the Department of Radiation Science and Technology and Director of the Reactor Institute Delft (RID), a 2-MW research nuclear reactor, which is part of UTD. He has been working in the field of radiochemistry since 1982 (routes of production of radionuclides, radio-analysis and radiotracer techniques), with emphasis on process dynamics, reaction kinetics, metal physiology, environment and health, and medicine. He (co-)authors some 300 papers in international journals and conference proceedings on these and other radiochemistry topics. He initiated the environmental (biomonitoring) R&D at RID-UTD and is chairman of BioMAP. He is a regular session chairman and is a member of numerous program committees of international conferences. He is a regular reviewer for the leading radiochemistry, environmental and chemistry journals, especially on issues such as environmental emissions from power plants and other industrial installations, and its (bio)monitoring by emission assessment, and a member of the editorial boards of several of these journals. He is a member of the board of the Dutch Nuclear Society, member of the section Radio- and Radiation Chemistry of the Royal Dutch Chemistry Society (KNCV), board member of the Division of Nuclear and Radio-Chemistry (DNRC) of the European Association for Chemical and Molecular Sciences (EuCheMS) and member of the Scientific Board of the UTD Institute of Safety and Security.

Dr. Bernd Markert is University-Professor and studied Chemistry and Biology at the Ludwig Maximilian University in Germany. He acquired his PhD in 1986 and his habilitation for ecology in 1993 at the University of Osnabrück (Germany). Furthermore he had been a scientific collaborator at the Nuclear Research Center in Jülich (Germany), Central Department for Chemical Analysis and group leader of the study group on Sampling and Sample Preparation. From 1992 to 1993, he was head of the Department of Analytical Chemistry at the Institute for Inland Water Research of the GKSS Research Center in Magdeburg (Germany). From 1994 to 2003, he was Director of the International Graduate School Zittau, Univ.-Professor for Environmental High Technology and member of the Standing Conference of Saxony University Presidents. He is the founder and head of the "Environmental Institute of Scientific Networks" (EISN-Institute), Germany, and board member of i.a. INTECOL (International Association of Ecology) and BioMAP (Biomonitoring of Atmospheric Pollution). Publications: author/co-author/editor/co-editor of about 300 scientific papers and 25 scientific books. Research interests: Biogeochemistry of trace substances in the water/soil/plant/animal/human system; Instrumental analysis of chemical elements; Developing the "Biological System of the Elements"; Eco- and human-toxicological aspects of hazardous substances; Pollution control by use of bioindicators and biomonitors. Development of technologies for waste management, environmental restoration and remedial action on soils; Different interdisciplinary working fields of economic and social sciences.

Dr. Stefano Loppi got a PhD in environmental biology and is now assistant professor of Environmental Botany at the Department of Life Sciences, the University of Siena, Italy. His research interest is focused on the study of the biological effects of air pollution on sensitive organisms, especially lichens, to be used as biomonitors. He cooperates with several groups in Italy and abroad, especially Greece, Slovakia and Portugal, and a scientific coordinator of several research projects. He is a member of the editorial boards of several international journals, President of the Italian Lichen Society (2011–2014), member of the Steering Committee of the Foundation for Climate and Sustainability (2012–2015), member of the Steering Committee of BioMAP and author of >100 scientific papers in refereed journals. Alderman committed to environment of Foiano della Chiana municipality (2009–2014).