

Conference Reports

The 3rd International Conference in Lithuania: Metals in the Environment

Vilnius, Lithuania, April 26–29, 2006

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The 3rd International Conference on 'Metals in the Environment' took place 26–29 April 2006 in Vilnius, Lithuania as part of the International Year of the Planet Earth.

The Conference was organized by the Lithuanian Metalecology Society under the chairmanship of Dr. Danutė Marčiulionienė, Institute of Botany. The Organizing Committee operated under the leadership of Dr. Ričardas Taraškevičius from the Institute of Geology and Geography, with members from the Lithuanian Radiation Protection Society. There were numerous other Lithuanian and international organizations that cooperated in organizing and sponsoring the Conference. Abstracts of all presentations (oral and poster) were published as a 248-page book and were distributed among participants. The most interesting papers will be selected and recommended for publication in established international scientific journals as research communications.

The aim of the International Year of Planet Earth was to demonstrate new and exciting ways in which Earth sciences can help future generations meet the challenges involved in ensuring a more safe and prosperous world. Although Lithuanian scientists dominated the attendance, scientists from 25 countries including those from Chile, China, Egypt, and the United States were also present at the Conference. There were many young researchers, and internationally recognized Research Professors. The Conference had a friendly and open atmosphere that stimulated discussions and exchange of scientific opinions.

Specialists of environmental chemistry, ecotoxicology, environmental and human health presented their recent research results and theoretical conclusions. The main objectives of the conference were to (1) present the development of methods for the identification of emission sources and hot spots of hazardous trace elements; (2) to investigate the accumulation and migration of metals and radio nuclides in the natural and urban environments; and, (3) to evaluate the influence of metals and radio nuclides on biota, and human populations. Special attention was paid to the problems of polluted environments and site remediation programs. This included the discussion of the socio-economic relationships and legal actions as well as educational initiatives that were designed to increase public awareness. The beginning of the Conference coincided with 20th anniversary of Chernobyl nuclear accident, and hence much discussion centered on radioactive pollution.

The Scientific Programme of the Conference consisted of 150 presentations, and was divided into five sessions: G) Geochemistry and Environment; R) Accumulation, Migration and Biological Effects of Radionuclides; B) Bioaccumulation, Toxicity of Metals and Remediation of Contaminated Sites; H) Metals and Health; and, I) Legislation, Education, Training and Information. Each session had one or more keynote lectures, short oral presentations, and posters. Some sections had special subsections: Regional Geochemical investigations, Pollution of the Atmosphere, Soil Chemistry, Wa-

Keynote speakers

Session	Speaker	Institution	Title of Lecture
G	Prof. Reijo Salminen	Geological Survey of Finland, Espoo, FINLAND	Environmental Applications of Regional Geochemical Maps
H	Dr. Olle Sellinus	Geological Survey of Sweden, International Medical Geology Association (IMGGA), SWEDEN	Medical Geology: A rapidly emerging discipline
R	Prof. Elis Holm	Lund University, Lund, SWEDEN	Transuranium Elements in Chernobyl Fallout. A Review of the Situation 20 Years after the Accident
B	Dr. Awadhesh N. Jha	School of Biological Sciences, University of Plymouth, UK	Evaluating Genotoxicity and Ecotoxicity of Metals: <i>in vitro</i> , <i>in vivo</i> and Field Studies
H	Prof. Donald Oberleas	Texas Tech University, Lubbock, Texas, USA	The Physiology and Biochemistry of Selected Essential Minerals
I	Prof. Stanislav A. Geras'kin	Institute of Agricultural Radiology and Agroecology, Obninsk, RUSSIA	The Use of Plants for Environmental Monitoring and Assessment
I	Prof. Enrico Sabbioni	EU DG, Joint Research Centre – Ispra, European Centre for the Validation of Alternative Methods (ECVAM), ITALY	The Role of <i>in vitro</i> Toxicity Testing for Legal Purpose in Metal Toxicology Research
I	Dr. Vladimir Zaichik	Medical Radiological Research Centre of Russian Academy of Medical Sciences, RUSSIA	Medical and Biological Elementology as a New Scientific Discipline

ter and Sediments, Analytical Equipment, Landfills, Trace Elements and Human Health, Environmental Pollution and Monitoring, Biological Effects and Mechanisms of Metals Impact. These topic areas represented the magnitude of the scope of the Conference.

In the session on 'Accumulation, Migration and Biological Effects of Radionuclides', the main topics were discussions of the problems of environmental pollution that occurred after the nuclear accident in the Chernobyl Power Station on 26 April 1986. Among the 30 presentations within this session many (ca. 1/3) were devoted to the evaluation of impact of Chernobyl accident. The keynote lecture by **Prof. Elis Holm** from Lund detailed his analyses of transuranium isotopes as a means of assessing the current contamination situation from the Chernobyl fallout. Other presentations dealt with the problems of radioactive waste or closed reactor site pollution by radioactive nuclides. Radiological monitoring and plant biomonitoring were described as a means for evaluating long-term environmental impacts from accidents. Some presentations dealt with technical and metrological problems in monitoring and analysing data sets and their measures of uncertainties.

The importance of geochemical maps was the focus of the lecture by **Prof. Reijo Salminen** from the Geological Survey of Finland. He presented a short the history of their use and pointed out the main advantages and many possibilities for practical applications. In this time of globalisation of pollution, the information from geochemical mapping may provide appropriate background information for legislation and political solutions. In the session on 'Geochemistry and Environment' presentations and discussions focused on regional investigations and the pollution of soil and its relationship with atmospheric pollution. This was described as a very significant problem for Lithuania and other Baltic States that has resulted from the long-range transboundary transport of various industrial pollutants such as sulphur and nitrogen oxides from Western Europe. Many interesting data were presented about soil pollution by heavy metals, selenium, arsenic compounds, and radioactive nuclides.

Dr. Olle Selinus from the Geological Survey of Sweden in his keynote lecture 'Medical geology – a rapidly emerging discipline' demonstrated that environmental conditions and their peculiarities have a great influence on the health of human populations. In 2006 a new association was established, and appropriately named the 'International Medical Geology Association' (IMGA) (<http://www.medicageology.org>). It was noted that universities throughout the world are starting courses and education programs in this new field of science, and a worldwide collaboration has started between geoscientists, environmental specialists, epidemiologists, toxicologists, and the scientists that study social ecology. This new discipline is similar to medical geography and global epidemiology.

Numerous presentations about the estimation of toxicity and attempts to reveal the mechanism of toxic action revealed some rather contradictory statements of knowledge in this field. For example, often the mechanisms of biochemical and physiological actions of chemical elements within the organ-

ism do not allow us to predict synergetic or inhibiting actions of those elements. **Dr. Vladimir Zaichik** proposed the use of more appropriate terms and definitions in this new scientific discipline that he named as 'Elementology'. Such studies are very important for evaluating links between health and abundance of heavy metals. In the Poster Section of this session, there were presentations about the usefulness of some heavy metals in healing of some diseases.

The problems associated with toxicity evaluation of new compounds, as well as instrumental methods that give data about the content of an element or its compound, do not provide for an exact criteria for assessment of its hazardousness. As noted by **Prof. Enrico Sabbioni** in his keynote lecture, the new EU Chemical Policy foresees regulatory actions to prevent health risks from exposure to chemicals. Different kinds of toxicity data such as systemic and topical toxicity, genotoxicity, carcinogenicity, and reproductive toxicity will be required. The availability of such data to improve the scientific basis of the integrated approach of risk assessment using *in vitro* data derived from human and animal studies. In this context, the European Centre for Validation of Alternative Methods (ECVAM) has been set up in order to coordinate activities to promote various toxicity testing that will be important to the biosciences and to health care programs. In addition, the findings on nanoparticle toxicity suggested that the emerging issue of nanotoxicology maybe more complicated than previously thought. In many of the presentations, biological testing was shown to be useful for monitoring and analysing data.

Participants of the Conference had the unique opportunity to see Lithuanian's cultural heritage in Vilnius. One of the excursions was to one of the oldest universities in East Europe established by King Stephan Bator at 1579. Other excursions were concerned the geochemical, historical, and cultural-ethnographical heritage and natural environment of Lithuania along the routes 'Vilnius – Geographical Centre of Europe' or 'Vilnius – European Geographic Centre – Kernavė – Rumšiškės'. Such field sessions provided additional information about the environmental state of the new EU Members States, and how they apply European Directives, Norms and other regulations.

Overall, the success of the Conference was positive as it revealed the hot spots in the evaluation of metal impacts on the conditions of biota and human health. Regular (within 2 or 3 years) meeting of scientists, which are active in this field, will be very important to achieve the necessary legal regulations within the whole world as a 'Community'. Indeed, this event met the expectations of the planners of International Year of Planet Earth. In the fields of environmental science and pollution research, a large amount of new data was presented that will require further analyses and theoretical generalizations. As it was shown in this Conference, the scope of 'Metals in the Environment' as a scientific discipline is very complicated and intertwined with many other scientific disciplines that involve studies of biotic and abiotic ecosystems. Moreover, the importance of the 'scientific method' in all investigations must be supported by the most precise measurements as possible, with an appropriate assessment of their uncertainties.