

Environmental and health effects of  
toxic elements, metal ions, and minerals

## 2006 INTERNATIONAL WORKSHOP **MEDICAL GEOLOGY** METALS, HEALTH AND THE ENVIRONMENT

**May 25-26, 2006**  
**University of Aveiro, Portugal**

*Jointly Sponsored by:*  
**U.S. Armed Forces Institute of Pathology (AFIP)**  
**U.S. Geological Survey (USGS)**  
**Geosciences Department of University of Aveiro, Portugal**  
**International Union of Geological Sciences (IUGS)**  
**International Medical Geology Association (IMGA)**  
**Geological Survey of Sweden (SGU)**



### **SCOPE AND PURPOSE:**

The scope of this Workshop is to share the most recent information on the relationship between impacts of toxic metal ions, trace elements, natural dusts, and their impact on the environmental and public health issues. The scientific topics of the Workshop will include environmental toxicology, environmental pathology, geochemistry, geoenvironmental epidemiology, extent, patterns and consequences of exposures to toxic metal ions and dust in the general environment (with the stress on the water quality), biological risk assessment studies, modern trends in metal analysis and updates on the geology, toxicology and pathology of metal ion and dust exposures.

### **OBJECTIVES:**

At the completion of this Workshop, the attendees will be able to:

- Know and gain information on the type of evidence available about geological sources and processes, environmental health, toxicology, and pathological manifestations of exposures of toxic metal species.

- Know and gain information about geochemical processes, natural and anthropogenic sources, speciation, modes of occurrence; to assess the impact of trace elements and toxic metal ion species on human and environmental health.
- Have an elementary understanding of environmental toxicology, epidemiology, medical geology as applied to the study of toxic metal species and trace elements.

#### **WORKSHOP LEADERS:**

**Dr. José A. Centeno, Armed Forces Institute of Pathology, Washington, DC**

**Dr. Olle Selinus, Geological Survey of Sweden**

**Dr. Robert B. Finkelman, University of Texas at Dallas, Texas, USA**

**Dr. Eduardo Anselmo Ferreira da Silva, University of Aveiro, Portugal (Organizer)**

#### **INVITED SPEAKERS:**

**Dr. Florabel G. Mullick, The Armed Forces Institute of Pathology, Washington, DC**

**Dr. Bernardino Ribeiro de Figueiredo, Instituto de Geociências do Departamento de Geologia e Recursos Naturais. Universidade de Campinas. São Paulo, Brasil**

**Dr. Mark Lyles, Bureau of Medicine, Washington, DC**

#### **ABOUT THE SPEAKERS:**

**Dr. José A. Centeno** is a Senior Research Scientist and Chief of the Division of Biophysical Toxicology and the Education and Research Branch at the Department of Environmental and Toxicologic Pathology, U.S. Armed Forces Institute of Pathology (AFIP) in Washington, D.C. Dr. Centeno received his BS and MS in chemistry from the University of Puerto Rico at Mayagüez in 1979 and 1981, respectively; and a Ph.D. in Physical Chemistry from Michigan State University in 1987. He has presented over 200 invited seminars and lectures, and published over 85 manuscripts on various topics of environmental toxicology, biomedical research and environmental health issues. He has served on the organizing and scientific committees of several international conferences, including as General Chairman of the 6<sup>th</sup> *International Symposium in Metal Ions in Biology and Medicine* (ISMIBM) (May 7-10, 2000), and co-chairman of the 7<sup>th</sup> and 8<sup>th</sup> ISMIBM (2002&2004). He has served on several international environmental and human health committees including the International Agency for Research on Cancer, the U.S. TOSCA-Interagency Testing Committee and the International Working Group on Medical Geology, and is currently serving as a committee member for the National Research Council Committee on Research Priorities for Earth Science and Public Health. He serves on the Editorial Board of three scientific journals, as associate editor of the book on *Essentials in Medical Geology*, as founding member and co-chair of the International Medical Geology Association, and as Director of the International Registry on Medical Geology. Dr. Centeno holds adjunct faculty professorships at four universities, is the recipient of the 1999 Distinguish Alumni Award on Science from the University of Puerto Rico-Mayaguez, Guest Professorship Award from China University of Mining and Technology (2002), Distinguished Professor Award from Turabo University in Puerto Rico (2003), and William Evans Visiting Fellow from University of Otago, School of Medicine in Wellington, New Zealand (2004). Over the last decade, he has focused attention on environmental toxicology, environmental pathology, and health effects of trace elements, toxic trace metals and metalloids, and has conducted research and teaching activities on medical geology in over 25 countries.

**Dr. Robert B. Finkelman**, a senior research scientist at the U.S. Geological Survey (USGS) in Reston, VA, is widely known for his work on coal chemistry and as a leader of the emerging field of Medical Geology. He has degrees in geology (The City College of New York, 1965), geochemistry (The George Washington University, 1970), and chemistry (The University of Maryland, 1980). Dr. Finkelman has a diverse professional background having worked at the USGS for 32 years, 7 years for Exxon, and has experience as a consultant and as a college instructor. Most of Dr. Finkelman's professional career has been devoted to understanding the properties of coal and how these properties affect coal's technological performance, economic byproduct potential, and environmental and health impacts. For the past 10 years he has devoted his efforts to developing the field of Medical Geology. Dr. Finkelman is the author of 500 publications and has been invited to speak in more than 30 countries. He is an officer in several professional societies, associate editor of two scientific journals, and holds adjunct professorships at five universities. Dr. Finkelman was Chairman of the Geological Society of America's Coal Geology Division, 1990; Chair of the International Association for Cosmochemistry and Geochemistry, Working Group on Geochemistry and Disease, 1998 to present; founding member and co-chair of the International Medical Geology Association; recipient of the Ninninger Meteorite Award, 1969; recipient of the Gordon H. Wood Jr. Memorial Award from the AAPG Eastern Section, 1999; a Fellow of the Geological Society of America since 1988; and the 2004 recipient of the Cady Award from the GSA's Coal Geology Division. Dr. Finkelman is currently the President of the Society for Organic Petrology and was a recipient of a 2004 U. S. State Department Embassy Science Fellowship in South Africa.

**Dr. Florabel G. Mullick** is the Principal Deputy Director of the Armed Forces Institute of Pathology (AFIP) and member of the U.S. federal Senior Executive Service. Dr. Mullick is also the Director for the Center for Advanced Pathology and Chair of the AFIP Department of Environmental and Infectious Disease Sciences. Dr. Mullick is a physician executive and managing scientist responsible for the development of an international computer database of both human and animal lesions resulting from toxic drugs and chemicals. Dr. Mullick received her Doctor of Medicine degree from the School of Medicine in Puerto Rico, her pathology training at University Hospital in Puerto Rico, Children's Hospital in Washington, D.C., and Georgetown University Hospital in Washington, D.C. She is a Diplomate of the American Board of Pathology in Anatomic Pathology and Secretary of the International Academy of Pathology. Over the last decade, Dr. Mullick has focused her research efforts on the study of human health effects of toxic drugs and toxic trace metals with particular emphasis on liver diseases and pediatric pathology cases.

**Dr. Olle Selinus** is a Ph.D. geologist working with the Geological Survey of Sweden (SGU). During the 1960s and 1970s he worked in mineral exploration with a mining company and at the GSS. Since the beginning of the 1980s. Dr. Selinus research work has been focused on environmental geochemistry and geostatistical methods, including research on medical geology. He has served as the organizer of several international conferences in this field and has published over 40 manuscripts. Dr. Selinus is currently the Head of the Geochemical Division at SGU in charge of research and development. He serves as Editor-in-Chief for the book on "Essentials of Medical Geology", as officer of COGEOENVIRONMENT and as chairman of its international Initiative on Medical Geology, co-chairman of the International Medical Geology Association, and co-chairman of the IGCP project #454 Medical Geology.

### **WHO SHOULD ATTEND?**

The Workshop is intended for geologists, geochemists, ecologists, chemists, biologists, occupational and environmental scientists, medical professionals, toxicologists, epidemiologists, environmental pathologists, bio-statisticians and any other health, environmental and geosciences professional with interest on Medical Geology issues, particular interest on the effect of toxic metal ion species on environmental and human health. An important aim of the Course is to provide the opportunity for forming contacts and networks between professionals working in different areas of environmental and human health.

The participants will receive Certificates of Attendance.

### **POSTERS**

The exhibition of posters is welcome (one A4 abstract should be sent **before 30 April 2006**).

Maximum poster dimensions 120cm x 100cm.

### **ACCREDITATION STATEMENT**

This activity has been planned and implemented in accordance with Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME), through the joint sponsorship of the Armed Forces Institute of Pathology and the American Registry of Pathology. The Armed Forces Institute of Pathology is accredited by the ACCME to provide continuing medical education for physicians, and takes responsibility for the content, quality, and scientific integrity of this CME activity.

The Armed Forces Institute of Pathology designates this educational activity for a maximum of 14.75 AMA Physician's Recognition Award Category 1 credits. Physicians should only claim credit commensurate with the extent of their participation in the activity.

## SCIENTIFIC PROGRAM

### Day 1: Thursday, May 25, 2006

- 8:00 – 8:30 REGISTRATION
- 8:30 – 9:00 WELCOMING REMARKS – UNIVERSITY OF AVEIRO AUTHORITIES  
Dr. Eduardo A. Ferreira da Silva, Universidade de Aveiro (UAVR)
- 9:00 – 9:30 Objectives and Short Description of the Course  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 9:30 – 10:15 Medical Geology: An emerging discipline in environmental and human health.  
*Dr. Olle Selinus, SGU*
- 10:15 – 10:30 Tea and/or Coffee Break
- MODULE A Environmental Health: Sources of Exposure and Health Effects of Trace Elements, Toxic Metal Ions, Metalloids**
- 10:30 – 11:30 The Diversity of Trace Elements and Toxic Metal Ions in Environmental Health and Medical Geology  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 11:30 – 12:30 Natural and Anthropogenic Sources, Transport and Fate of Toxic Metal Ions in the Environment  
*Dr. Robert B. Finkelman, UGGS*
- 12:30 – 14:00 LUNCH
- MODULE B Environmental Toxicology, Geochemical Studies and Health Effects.**
- 14:00 – 14:45 An Environmental Pathology Overview of Tissue Reactions to Selected Toxic Metals and Metal Compounds  
*Florabel G. Mullick, MD, AFIP*
- 14:45 – 15:30 An Overview of Health Impacts of Coal and Coal Use  
*Dr. Robert B. Finkelman, UGGS*
- 15:30 – 16:00 Tea and/or Coffee Break
- 16:00 – 16:30 Arsenic Poisoning: Natural History, Toxicology and Health Effects  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 16:30 – 17:15 The health impacts of trace elements released by residential coal combustion – A Case studies of arseniasis and fluorosis  
*Dr. Robert B. Finkelman, UGGS*
- 17:15 – 18:00 Arsenic in the environment and human exposure: study cases in South America  
*Bernardino Ribeiro de Figueiredo, PhD, Universidade de Campinas*
- 18:00 – 18:15 Discussion and Summary- Dr. Jose A. Centeno – USAFIP/Dr. Eduardo Ferreira da Silva – UAVR
- 18:15 – 19:00 Poster Session

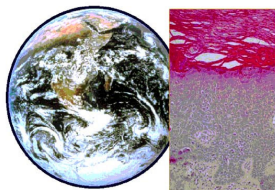
## Day 2: Thursday, May 26, 2006

### **MODULE C Analytical Toxicology: Trace Element Speciation, Microscopy, Detection, and Quantification Methods**

- 8:00 – 8:15 Welcome and review  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 8:15 – 9:00 Clinical and Toxicological Effects of Mercury Exposure.  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 9:00 – 9:45 Analytical methods for the study of trace elements and toxic metal ions in geological and environmental samples.  
*Dr. Robert B. Finkelman, UGGS*
- 9:45 – 10:30 Trace Element Speciation in Environmental Medicine and Toxicology and Analytical Methods for the Study of Metal Ions in Biological and Tissue Samples  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 10:30 – 11:00 Tea and/or Coffee Break
- 11:00 – 12:00 Development and Use of International Geological Databases on Medical Geology  
*Dr. Olle Selinus, SGU*
- 12:00 – 13:00 LUNCH

### **MODULE D Special Topics on Medical Geology and Human Health Research**

- 13:00 – 13:30 The Health Impacts on Mineral Dust  
*Dr. Robert B. Finkelman, UGGS*
- 13:30 – 14:15 The Chemical, Biological & Mechanical Characterization of Micro-Particulate Dust from Iraq and Kuwait  
Mark B. Lyles, MS, DMD, PhD, Washington, DC
- 14:15 – 14:45 Emerging (and re-emerging) infectious diseases: Is there a Role for Medical Geology?  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 14:45 – 15:00 Tea and/or Coffee Break
- 15:00 – 15:45 Application of Medical Geology to Vector Borne Diseases and Other Issue  
*Dr. Robert B. Finkelman, UGGS*
- 15:45 – 16:15 Case Studies on Medical Geology and Environmental Health  
*Dr. José A. Centeno, AFIP, Washington, DC*
- 16:15 – 16:45 Health benefits of rocks and minerals  
*Dr. Robert B. Finkelman, UGGS*
- 16:45 – 17:00 Discussion
- 17:00 – 18:00 Panel Discussion: All Speakers –  
Topics: i. Regional Issues on Medical Geology and Human Health ; ii. Current Research Opportunities on Toxicology, Medical Geology and Human Health  
Moderator: Dr. Bernardino Figueiredo, UNICAMP; Dr. Eduardo Ferreira da Silva, UAVR
- 18:00 – 18:30 Distribution of Certificates of Attendance



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**REGISTRATION FORM**

Please Complete and return (by fax or email) to:	<b>Prof. Dr. Eduardo Anselmo Ferreira da Silva</b> Departamento de Geociências. Universidade de Aveiro. Campus de Santiago. 3810-193 Aveiro. PORTUGAL Fax: +351-234-370605 Email: <a href="mailto:eafsilva@geo.ua.pt">eafsilva@geo.ua.pt</a>
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Surname(s): \_\_\_\_\_ First Name: \_\_\_\_\_  Dr  Prof  
 Mr  Ms

Title /Position: \_\_\_\_\_

Organization: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Postal Code: \_\_\_\_\_ Country: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

**Payment Mode**

Conference registration Fees		
Medical Geology Wokshop	Normal	Students(a)
Until 30 April 2006	150 € <input type="checkbox"/>	75 € <input type="checkbox"/>
After 1 May 2006	200 € <input type="checkbox"/>	125 € <input type="checkbox"/>

(a) – only valid for undergraduate students

**Cheque in Euros** (name: Universidade de Aveiro )

Cheque nº \_\_\_\_\_

Bank \_\_\_\_\_ to attend

the **Medical Geology International Workshop**

**Bank Transfer Details**

<b>BANK</b>	Caixa Geral de Depósitos
<b>Account Holder</b>	<b>Medical Geology Workshop</b>
<b>Account :</b>	<b>IBAN :</b> PT50003501230009770193010 <b>NIB :</b> 003501230009770193010 (válido para Portugal)
<b>Address :</b>	Universidade de Aveiro Campus Universitário 3810-193 Aveiro Portugal

### Receipt

Please provide the following information:

Name: \_\_\_\_\_

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More about medical geology you can find at the homepage: <http://www.medicalgeology.org>