SEE PAGE 13 FOR A REPORT ON THE 3RD HEMISPHERIC CONFERENCE ON MEDICAL GEOLOGY
Poster and presentation awards on page 14


Cássio Roberto da Silva
Prof. Dr. Nelly Mañay
Sandra Londono

Inside this issue:

MESSAGE FROM THE CHAIRMAN 2
CHAPTER REPORTS 3
IMGA DISTINGUISHED SERVICE AWARDS 6
NOTICES 9
REPORTS ON CONFERENCES, ETC. 10
UPCOMING CONFERENCES ETC. 15
IODINE IN WATER, IRAQ 18
ENVIRONMENTAL FACTORS ON KIDNEY STONES, ITALY 20
MANGANESE AND PARKINSON’S DISEASE, IRAQ 22
EDITORIAL POLICY AND INSTRUCTIONS TO AUTHORS 24
MESSAGE FROM THE CHAIRMAN

Dear IMGA Colleagues:

Welcome to another issue of the International Medical Geology Association (IMGA) Newsletter. This issue will be the last Newsletter for 2009, demonstrating the remarkable progress that IMGA has achieved during this memorable year. Take time to read through and enjoy the useful information that is offered to our membership.

This year, 2009, has been a very productive and impressive year for IMGA, and I would like to take this opportunity to share with you some of the most exciting and remarkable events that have shaped and strengthened the future of IMGA. One of the main goals for the development of IMGA activities and outreach programs worldwide, in 2009, has been the development of IMGA Chapters. IMGA Chapters have been established in Bolivia, Brazil, Ghana, Iran, Argentina, Portugal, Italy and Uruguay. A Chapter is a way to "locally" facilitate the growth of medical geology, and a fundamental basis by which larger societies strengthen their regional, national, and eventually their international development. Our approach is based on a commitment to our membership and others who have placed their trust in us to promote and expand worldwide, the goals and objectives of Medical Geology. Don’t miss the detailed description on our Chapters provided by Fiona Fordyce, as well as examples of the growing contributions and activities from many of our Chapters such as the Bolivian Chapter on Medical Geology described by Dr. Jaime Rios Dalenz.

In 2009, thanks to the efforts of our various committees, conferences and short courses we saw our membership increase by an outstanding rate of 25-30%.

This year, IMGA has over 250 members pursuing activities, projects and training programs on Medical Geology worldwide. The growth in our membership is a tribute to the outstanding services, dedication and commitment offered by our members, chapters and committees.

Equally impressive has been the results of our 3rd Hemispheric Conference on Medical Geology which was held in the week of October 12-16, 2009, in Montevideo, Uruguay under the leadership of Prof. Dr. Nelly Manay. The meeting in Montevideo follows in the tradition of our previous meetings by bringing together outstanding scientists working in the multidisciplinary field of medical geology, promoting exchange of scientific ideas and results in a relaxed setting that made the experience memorable and valuable to research and training progress on medical geology.

It is important that our membership is aware of the latest developments on medical geology. At IMGA we strive to provide the latest information and we hope that you consider the IMGA Newsletter a key resource for the exchange of information. If you have any questions, comments, additions, request, manuscripts or story ideas, please feel free to contact us at http://www.geologimedica or at my email at jose.a.centeno@us.army.mil.

I would like to end this introduction by wishing to you and your family, Happy Holidays and a very prosperous New Year 2010.

Jose A. Centeno
Chairman, IMGA
The role of Chapters within IMGA and the rules governing them are described in the IMGA bylaws as:

Chapters are groups within a region bringing together people in an area (city, country, etc.) or in an organization (university, government agency, etc.) interested in Medical Geology. All members of the Chapter must be members of the Association. A Chapter must consist of at least five (5) members. To be recognized as a formal Chapter the members must send a request to the IMGA Committee. Upon approval a certificate of recognition will be issued.

Chapters are designed to operate within the "confinements" of their locality and therefore they are complimentary to the Regional Divisions of MGA and shall not compete with the Regional Divisions which are regional, in most cases involving several countries.

Members of chapters pay individual dues to IMGA. All affiliated organisations, including Chapters, must send regular reports for the newsletter. Short reports describing your Chapter and its' activities should be sent to Dave Elliott the IMGA newsletter editor by the newsletter submission date at davide5@telus.net.

IMGA Local Chapters and contacts at November 2009 are listed below

**Argentina**
Contacts: Prof Eduardo Santini and Dr Alberto Filomeno (Pathologists)
[antinaraujo@flash.com.ar](mailto:antinaraujo@flash.com.ar) and [afilomeno55@gmail.com](mailto:afilomeno55@gmail.com)

**Bolivia**
Contact: Dr Jaime Rios Dalenz (Pathologist)
[ jriosdal@hotmail.com](mailto:jriosdal@hotmail.com)

**Brazil**
Contact: Dr Bernardino Figueiredo, Institute of Geosciences, University of Campinas
[berna@ige.unicamp.br](mailto:berna@ige.unicamp.br)

**China**
Contact: Prof Zheng Baoshan, Institute of Geochemistry, Chinese Academy of Sciences
[ zhengbs@public.gz.cn](mailto:zhengbs@public.gz.cn)

**Colombia**
Contact: Sandra Londono, Universidad Nacional de Colombia
[ selondonoa@unal.edu.co](mailto:selondonoa@unal.edu.co)

**Ghana**
Contact: Dr Emmanuel Arhin, University for Development Studies, Navrongo
[ eaarhin@yahoo.com](mailto:eaarhin@yahoo.com)

**Iran**
Contact: Dr Abdolmajid Yaghubpur, Department of Geology, Tarbiat Moalem University
[ayaghubpur@yahoo.com](mailto:ayaghubpur@yahoo.com)

**Italy**
Contact: Prof Saverio Fiore, Institute of Methodologies for Environmental Analysis
[fiore@imaa.cnr.it](mailto:fiore@imaa.cnr.it)

**Japan**
Contact: Prof Hisashi Nirei, The Geo-pollution Control Agency
Email: nireihisashi@msn.com

**Portugal**
Contact: Dr Eduardo Ferreira da Silva, Geosciences Department, University of Aveiro
[ eafsilva@ua.pt](mailto:eafsilva@ua.pt)

**Republic of Macedonia**
Contact: Dr Tena Sijakova, Faculty of Mining and Geology, Macedonia
[ sijakova@yahoo.com](mailto:sijakova@yahoo.com)

**Uruguay**
Contact: Prof Nelly Manay, Dept of Toxicology and Environmental Hygiene, University of the Republic, Montevideo
[ nmanay@fq.edu.uy](mailto:nmanay@fq.edu.uy) and [nellymanay@gmail.com](mailto:nellymanay@gmail.com)
On November 6, 2009 the Bolivian Chapter of IMGA had lectures about health, environment and the Amazonic region that covers a very large territory belonging to Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela and Guyana.

The first lecture was on "Mercury exposure in the Bolivian Amazon", by Dr. Flavia Barbieri on several studies done by the French Institute of Research for Development (IRD) with San Andres and San Simon Universities. The studies showed in hair mercury concentration, of natives living in three rivers, a strong positive relationship between fish consumption and hair mercury, but was below the accepted limit value. (See Medical Geology Newsletter No. 14).

The other lecture was from Dr. Mauricio Dorfler, Executive Director of the "Organización del Tratado de Cooperación Amazónica" (Amazonic Treaty of Cooperation) with its headquarters in Brasilia, about the treaty and health in the Program of Environmental Health Surveillance. Many problems of the Amazonic countries regarding health matters were discussed and suggestions made on this treaty, to the governments dealing with them.

In 2009, the Colombian Chapter strengthened local networks with the geological survey of Colombia (INGEOMINAS) through active participation in medical geology projects related to mining activities. The group has focused its efforts to inform the academic community, as well as the environmental, health and energy sector about the relevance and benefits of doing research in Medical Geology in Colombia. The largest impact of the group is felt within the student community, the group continues to attract students from different disciplines that meet on a regular basis to discuss chapters of the book Essentials of the Medical Geology and research papers, establishing interdisciplinary dialogues that enrich the perception of the participants while contributing to education.

First Iberoamerican Course On Forensic Geology

Academic events are an important part of the outreach strategy of the Chapter. The First Iberoamerican Course on Forensic Geology was held in Bogota at the end of March 2009. Renowned specialists of the field lectured during 5 days in a successful activity attended by geologists, chemists, doctors and lawyers from Colombia, Brazil and the USA. Among the speakers were Laurance Donnelly (England), Raymond Murray (USA), Alastair Ruffell (Ireland), William Schneck (USA) and Martin Molina (COL) who illustrated the basic facts, applications and the work that has been done in Colombia so far. Medical geology was also addressed in specific cases of environmental damage related to mineral resources that affected public health. The links between medical geology and law deserve more attention and need further development to integrate the science community and the public sector.

Introduction

The Colombian chapter has worked towards the consolidation of projects to raise the awareness of the area of Medical geology and its importance to the development and welfare of Colombian society. The Chapter relies on the Research group on Medical and Forensic Geology of the National University of Colombia.

Network Consolidation

Since June 2009 Ana María Rojas, an active group member, is part of INGEOMINAS and is currently developing a medical geology pilot project along with the environmental geochemistry group. The overarching goal is to establish a possible link
between heavy metal contamination and public health problems in the Momposina Depression, a watershed where five rivers converge. The streams receive large contributions of small-scale mining by-products, mainly mercury and cyanide.

Another group member, Ivan Dario Ortiz, is currently conducting a geochemical characterization of medicinal muds found in Paipa, Boyacá, known to have caused allergic reactions to users. One hypothesis is that the muds are contaminated but the pollutant, its source and possible health effect are unknown. IN-GEOMINAS is funding the research, which is Ivan’s undergraduate thesis.

Carlos Martínez, is a Chemistry and Pharmacy undergraduate student. He is working on clays applied to cosmetics. He has contacted researchers working on this topic from the National University of Mexico to apply for an internship during 2010. This capacity building is necessary to strength the chapter and the quality of Research work.

In order to establish cooperative networks, the group is trying to generate joint agreements with health entities, such as the National Health Institute of Colombia, to develop Medical Geology projects.

GRADUATE EDUCATION OF MEMBERS
Sandra Carolina Londoño, chair of the Colombian chapter was admitted into the graduate program of the School of Earth and Space Exploration (SESE) at Arizona State University. She will work with Lynda Williams, developing a Medical Geology Research project that will explore the mechanisms of action of antibacterial clays. This has encourage the group members by showing them the great perspectives and future of this field if they decide to answer the medical geology call.

THE COLOMBIAN CHAPTER AT THE 3RD HEMISPHERIC CONERENCE OF MEDICAL GEOLOGY, MONTEVIDEO, URU, 2009
The Colombian chapter was represent by Ana María Rojas who reported the activities of the Chapter during the IMGA business meeting.

The idea of establishing common guidelines to approach and develop the work of the chapters followed the meeting. This could be helpful to coordinate efforts and strengthen our weaknesses, using the experience of others. A suitable joint effort may have a greater overall impact on the dissemination, consolidation and implementation of medical geology in the world.

The idea was proposed by Bernardino Figuereido (Brazil) and Nelly Mañay (Uruguay) but no conclusion was reached, and we will look forward to work with the chairs of the Chapters

EUROPEAN REGION ACTIVITIES
Refer to Conferences, pages 10 et seq.

IMGA member Emmanuel Arhin has requested a notice to the effect that because hackers broke into his old e-mail account, it has become inaccessible. His new e-mail address is eaarhin1964@yahoo.com
Cássio Roberto da Silva, Geologist, MSc, has been with the Geological Survey of Brazil since 1978. His professional experience includes the execution and management of projects in geological mapping, mineral prospecting and environmental geology. He is the editor of Medical Geology in Brazil and Coordinator of the Environmental Geochemistry and Medical Geology National Program and website (www.cprm.gov.br/geologiamedica) for the Geological Survey of Brazil – CPRM. He is a founding member of the International Medical Geology Association (IMGA). Mr. da Silva collaborated on the 1st Short Course (2003) in Brazil and on the 2nd Hemispheric Conference (2007) and was the Coordinator of the 2nd Short Course on Medical Geology in Brazil (2005). He is also the Coordinator of the South American Division of the IMGA. Mr. da Silva is recognized for his many scientific and organizational contributions to Medical Geology and for being a key contributor to the successful growth of Medical Geology in Brazil.

Prof. Dr. Nelly Mañay is a chemical toxicologist with expertise in the area of toxic metal research. She has promoted Medical geology in Uruguay since 2002 as a member of of a working group and an organizer of the first short course on Metals, Environment and Health. She has been an invited lecturer in Medical Geology international short courses, including a highly successful second short course that she organized in Uruguay in 2005, and has been involved in the organization of scientific meetings, and regional symposia dealing with Medical Geology issues. Dr. Manay is one of the founding members of the IMGA. She was named as co-coordinator of the South American Division of Medical Geology together with Dr. Cassio Silva from the Geological Survey of Brazil. She was nominated as the chairperson for the 3rd HCMedGeo and GEM meeting that was held in Montevideo Uruguay, 12-16 October 2009 (www.geologiamedica.com) and she currently chairs the new “IMGA Conferences committee”. Dr. Mañay was a member of the IYPE Science Program for the Earth and Health theme. She is recognized for strengthening the integration between the public health and geoscience communities by facilitating research and training opportunities between these two communities in Uruguay.

Sandra Londono is currently a PhD student at Arizona State University working with Dr. Lynda Williams on antibacterial properties of clay minerals, a part of the medical potential of minerals, an area that she has been working on since her BSc in Colombia, which was the door to enter the arena of Medical Geology. Sandra Londono was instrumental in organizing a Colombian student group of medical geology that was officially introduced to IMGA during the II Hemispheric Conference held in Brazil in 2006. In order to join the IMGA global network, the IMGA Colombian chapter was created under the regional Division of South America. The chapter is composed of students, professors and professionals of different disciplines such as medicine, geology, environmental geochemistry, pharmacy, and chemistry and Sandra became the chair of the chapter. She was also elected to chair the IMGA Student Committee. Due to the Chapter’s activities, INGEOMINAS has recognized the relevance of medical geology and has recruited chapter members to officially adopt and develop the field inside the entity. The chapter now has members from the Colombian environmental ministry who are researching the impacts of geological factors in public health connected with current laws and procedures. Ms. Londono has been part of the organizing committee for the first forum of Medical Geology in 2006 and is currently helping to organize a medical geology course in Colombia that will be held in 2010. Sandra Londano is being recognized for these inspiring efforts by an undergraduate.
This new book addresses issues of regional medical geology from all over the world, with authors covering their respective regions. It gives many examples from different continents and also an overview of what is going on at present. The book is one of a series of books as a legacy to International Year of Planet Earth. The authors are well recognised geoscientific and medical specialists from the different regions.

Medical Geology is a rapidly growing field concerned with the relationship between natural geological factors and human and animal health, as well as with improving our understanding of the influence of environmental factors on the geographical distribution of health problems. Medical Geology brings together geoscientists and medical/public health researchers to address health problems caused or exacerbated by geological materials (rocks, minerals, atmospheric dust and water) and processes (including volcanic eruptions and earthquakes). Among the environmental health problems that geoscientists are working on in collaboration with the medical and public health community are: exposure to toxic levels of trace essential and non-essential elements such as arsenic and mercury; trace element deficiencies; exposure to natural dusts and to radioactivity; naturally occurring organic compounds in drinking water; volcanic emissions, etc. Medical geology also deals with the many health benefits of geologic materials and processes.

The book is about 450 pages long and contains the following chapters:

**Introduction**, Robert B. Finkelman, Heather Gingerich, Jose A. Centeno, North America, Geoffrey Plumlee, Gary Krieger
Jamaica, Carribean, Paul Wright
Mexico, Central America, M. Aurora Armienta, Ramiro Rodríguez, Nuria Segovia, Michele Monteil
S America, Bernardino R. Figueiredo, Marta I. Litter, Cássio Silva, Nelly Mañay, Sandra Londono, Ana Maria Rojas, C. Garzón, Tommaso Tosiani, Gabriela M. Di Giulio, Eduardo M. De Capitani, José Ângelo dos Anjos, Rômulo S. Angélica, Maria Celeste Morita, Monica M. Paoliello, Fernanda G. Cunha, Alice M. Sakuma, Otávio A. Licht
Indian subcontinent and region, C.B. Dissanayake, C.R.M. Rao, Rohana Chandrajith
China, Baosheng Zhang
Japan, Hisahi Nirei, Kunio Furuno
Australia, Oceania, Karin Ljung, Annemarie de Vos, Angus Cook, Philip Weinstein
Middle East, Humam Misconi, Mariam Navi
Africa, Theo Davies
Europe, Olle Selinus, Mark Cave, Eiliv Steinnes, Anne Kousa, Jaques Varet, Eduardo Ferreira da Silva
Case studies Greece, Lavrion, Alecous Demetriades
Humankind is under the permanent influence of the geological environment. The roles of some geological biotropic factors, such as volcanic explosions, strong earthquakes, and geochemical anomalies, have been well studied. Little is known about biotropic effects of degassing of the liquid outer core, geomagnetic activity, natural background radiation, fluid migration and gas emission within fault zones, mild seismicity, cyclicity of tectonic and climatic processes, etc. This book is the first attempt to synthesize the interdisciplinary knowledge on all geogenic factors influencing the human society and civilization.

The book has two parts. The first part represents state-of-the-art in studies on geo-bio-interactions. Chapter 1 demonstrates mutual relations between the fluid degassing of the Earth’s liquid outer core and origin of oil, life, and the biosphere. Chapter 2 looks at stable isotope fractionation in the human body and the role of natural background radiation in natural selection. Chapter 3 discusses health effects of geochemical anomalies. Chapter 4 investigates the potential of geopsychology, studying the impact of geophysical and geochemical variables on human behavior. The second part of the book introduces particular examples of the influence of the geological environment on the biosphere and anthroposphere. Chapter 5 considers the seismically-induced dependence of plant intrapopulation variability within active fault zones. Chapter 6 probes into geological and geophysical peculiarities of fault zones influencing human health in the urban environment. Chapter 7 considers the health effects of mild seismic events causing local variations of geophysical and geochemical parameters. Chapter 8 investigates the role of geomagnetic activity and seismicity in the occurrence of mystical experience and sacralization of the landscape. Chapter 9 presents a broad picture of the historical development displaying periodicity synchronous with cycles of climate and endogenous activity. Chapter 10 discusses multiple biotropic impacts of the Earth’s deep hydrogen degassing, which is responsible for seismic and volcanic activity, fluid migration and gas emission within rift and fault zones, ozone depletion, and climate fluctuations. The scientific intrigue of the book resides in the fact that most geogenic biotropic factors are functions or manifestations of two “meta-agents” – the deep hydrogen degassing and the geomagnetic field – which are generated by processes in the liquid outer core. This book, written by leading international experts, will be of interest to a wide audience of geologists, geochemists, geophysicists, biologists, biochemists, biophysicists, physicians, psychologists, anthropologists, archaeologists, and historians.

TABLE OF CONTENTS
Preface and Acknowledgments
Part I. Geology and Biology: Key relationships.
Chapter 1. Fluid evolution of the Earth and origin of the biosphere (Marakushev, A.A. and Marakushev, S.A.)
Chapter 2. Role of isotopes in the biosphere (Sobotovich, E.V., Florinsky, I.V., Lysenko, O.B. and Grodzinsky, D.M)
Chapter 4. Geopsychology: Geophysical matrix and human behavior (Mulligan, B.P., Suess Cloes, L., Mach, Q.H. and Persinger, M.A.)
Part II. Crossing a range of spatial scales
Chapter 5. Intraspecific variability of plants: The impact of active local faults (Boyarskikh, I.G. and Shitov, A.V.)
Chapter 6. Pathogenic effect of fault zones in the urban environment (Rudnik, V.A. and Melnikov, E.K.)
Chapter 7. Health of people living in a seismically active region (Shitov, A.V.)
Chapter 8. Sacred places and geophysical activity (Florinsky, I.V.)
Chapter 9. Tectonic and climatic rhythms and the development of society (Trifonov, V.G.)
Chapter 10. Hydrogen degassing of the Earth: Natural disasters and the biosphere (Syvorotkin, V.L.)

Retail Price: $145.00 10% Online Discount: $130.50
**Organic Compounds in Texas Groundwater and Kidney Disease**

Hannah Branning, a student at the University of Texas at Dallas, received a $1,000 grant from the Geoscience Department to support her research on the occurrence and distribution of organic compounds in Texas groundwater and their relation to kidney disease.

**GSA Geology and Health Division**

Bob Finkelman has been elected as the 2nd Vice President of the Geological Society of America's Geology and Health Division. Bob hopes to use this opportunity to force closer, mutually beneficial, ties between the IMGA and the G&H Division.

**Spanish Translation of Essentials of Medical Geology: Help Needed**

The Pan American Health Organization has rejected our request to translate *Essentials of Medical Geology* into Spanish. We feel strongly that it would be highly beneficial to have an inexpensive Spanish version of the book available for the large Spanish speaking population interested in medical geology. If you have any suggestions as to who we can approach with this concept please contact Bob Finkelman (bobf@utdallas.edu) or Jose Centeno (tonycent@comcast.net).

**EuroGeoSurveys Urban Geochemistry**

The EuroGeoSurveys Geochemistry Working Group on Urban Geochemistry lead by Dr Rolf Tore Ottesen of the Norwegian Geological Survey is producing a book on Urban Geochemical Mapping.

**EuroGeoSurveys Agricultural Soil and Geochemical Mapping Project**

The EuroGeoSurveys Geochemistry Working Group has commenced the GEMAS-Project (Geochemical Mapping of Agricultural Land and Grazing Land Soils of Europe). 34 European Geological Survey Organisations will collect samples of arable land (ploughing layer, 0-20 cm) and of land under permanent grass cover (0-10 cm) at a density of 1 site per 2500 km$^2$ in their territory. The total area covered will be about 5.8 million km$^2$. The project is a continuation and extension of the Baltic Soil Survey (Reimann et al., 2003). The project is led by Dr Clemens Reimann, of the Norwegian Geological Survey who is Chair of the EuroGeoSurveys Geochemistry Working Group and Vice President of the International Association of Geochemistry (IAGC). The European metals industry, represented by EuroMetaux in Brussels, will contribute to this project over a period of four years.


**Encyclopedia of Environmental Health**

Work is progressing on this exercise, and several IMGA members are contributing chapters to the Encyclopedia with publication (Elsevier) scheduled for October 2010. The contents are:

1) Medical Geology: Principles of Medical Geology
2) Toxicological Pathways in Medical Geology
3) Health Consequences of Mineral and Fuel Extraction
4) Health Effects of Volcanic and Geothermal Processes
5) Human Health and the State of the Pedosphere
6) The Impact of Natural Dusts on Human Health
7) Fluorine – Human Health Risks
The British Geological Survey (BGS) held a successful two-day Medical Geology meeting in March 2009. The meeting was supported by the International Medical Geology Association (IMGA) and the Society for Environmental Geochemistry and Health (SEGH), and brought together health and geoscience professionals working in the field of Medical Geology for the following presentations. Papers from the meeting will be published in a special issue of the Journal of Environmental Geochemistry and Health in 2010.

Session 1: Bioaccessibility of harmful substances
Olle Selinus (Geological Survey of Sweden / Chair IMGA) – The international development of medical geology - what will happen now and in the future?
Sebastien Denys (INERIS) – In-vivo validation of the Unified Barge Method for the bioavailability of As, Cd and Pb in soils
Mark Cave (British Geological Survey) – Measurement Modelling and Mapping of the bioaccessibility of Arsenic in the Tamar Catchment
Christine Davidson (University of Strathclyde) - Human Bioaccessibility of Potentially Toxic Elements in Urban Soils from Two European Cities
Tom Van de Wiele (University of Ghent) – Development of an in-vitro test for measuring the Bioaccessibility of Polyaromatic Hydrocarbons in contaminated soils
Chris Collins (University of Reading) – Model human digestive system for the determination of Bioaccessibility of environmental pollutants

Session 2: Biomonitoring
Randal Parrish (BGS/ Leicester University) - Environmental and military DU aerosol pollution: health and exposure assessment in light of recent UK and US studies
Raquel Duarte-Davidson (HPA) - An overview of human health risk and exposure assessment training needs across the EU
Mark Button (Leicester University / BGS) – Human toenails as a biomarker of exposure to elevated environmental arsenic
Jenny O’Reilly (Surrey University / BGS) – Biomonitoring / As speciation of human materials and environmental samples in As affected regions of Argentina
Paul Wright (ICENS, Jamaica) – Beta-2 Microglobulinuria in a Jamaican Population Exposed to Cadmium through Diet

Session 3: Hazard and Risk assessment
Paul Nathanail (University of Nottingham) – Bioaccessibility in human health risk assessment for regulatory purposes: Implications for the proposed Soil Framework Directive
Barry Smith (Intelliscience) – Risk assessment to technological materials: the importance of medical geology in crossing disciplines
David Polya (University of Manchester) – Groundwater Arsenic Attributable Health Risks in West Bengal- Application of Probabilistic Risk Assessment
David Large (University of Nottingham) – A Geological Re-evaluation of the Xuan Wei Lung Cancer Epidemic

Session 4: Deficiency / exposure health studies – impact on health
Andrew Hursthouse (University of the West of Scotland/ SEGH Chair) – Micronutrient Deficiency in Maternity and Child Health: exploring agricultural, medical and social influences on Fe and Zn deficiencies.
Charles Shand (MacAuley Institute) – Could exposure to silt adversely affect early life respiratory health?
Shona Kelly (Division of Epidemiology and Public Health, University of Nottingham) – Is environmental arsenic associated with increasing basal cell carcinoma incidence in Britain?

Session 5: Water, Air and Soil Quality
Mike Ellis (British Geological Survey) – Climate Change and its impact on Health
Alecos Demetriades (Institute of Geology and Mineral Exploration, Hellas) – Chemical speciation to assess bioaccessibility of potentially harmful elements in surface soil and house dust, Lavrion urban area, Attiki, Hellas
Nick Lloyd (Leicester University / BGS) – Environmental Fate of DU particulates after 25 years: implications for bioaccessibility
Clemens Reimann (Geological Survey of Norway) – EGG: European Groundwater Geochemistry Part I: Mineral Water

The Society for Environmental Geochemistry and Health (SEGH) held a session at this conference. For more information contact Anthony Staines, School of Nursing, Dublin City University, Dublin, Ireland anthony.

INTERNATIONAL SYMPOSIUM ON MINERALOGY, ENVIRONMENT AND HEALTH, Université Paris-Est Marne la vallée, France, 17 - 18 September 2009

The symposium focussed on the following topics:
Topic 1. Nanoparticles, environment and health
Topic 2. Environmental Health: Sources of Exposure and Health Effects of Trace Elements, Toxic Metal Ions, Metalloids
Topic 3. Mineral Dusts and Human Health
Topic 4. Soil–plant transfer: effect of soil mineralogy
Topic 5. Environmental Toxicology, Geochemical Studies and Health Effects

More information is available on the web-site: http://www.univ-mlv.fr/master_geoenv/symposium2009.html


This conference aimed to bring together "traditional" geoscientists (geochemists, hydrogeologists, engineers, geophysicists, mineralogists) and scientists outside traditional earth sciences (toxicologists, microbiologists, physicists, chemists) from both academic and industrial communities to present and discuss the state-of-the-art in the understanding of environmental pollution and the potential threats to human health. More information on the following presentations is available on the web-site: http://www.geolsoc.org.uk/gsl/events/listings/page4598.html

Paul Nathanail - 'The role of regulatory science in human health risk assessment of potentially contaminated land'
Anna Bogush et al. - 'Natural and modified materials for mine waste treatment'
Brighid Ó Dochartaigh et al. - 'Groundwater and Soil Pollutants (GRASP)'
Kevin Leahy et al. - 'Environmental risk to groundwater from a long-lived contaminant source area in the context of monitored natural attenuation'
Steve Robertson - 'Regeneration of Brownfield using sustainable technologies'
Joanna Wragg et al. - 'The fate of diffuse Pb pollution in urban soil; a case study from Sheffield, UK'
Amy Barsby - 'Trace element abundance and human epidemiology: the Tellus case study.'
Philippe Van Cappellen - 'Representing geomicrobial processes in environmental reactive transport models'
Robert A. Whittleston et al. - 'Microbially mediated chromate reduction in hyperalkaline conditions'
Karen Hudson-Edwards and Kate Wright - 'Interaction of flat and stepped jarosite surfaces with Cd, Cu and Zn: a computer simulation study'
Polya et al. - 'Probabilistic risk assessment of groundwater arsenic in southern Asia – key uncertainties'
Dragos Zaharescu et al. - 'Natural enrichment with arsenic in a high mountain cirque in the Pyrenees'
M A Hoque and W G Burgess - 'Deep groundwater in southern Bangladesh: vulnerability to arsenic invasion'
David Alderton - 'Arsenic and antimony pollution from metal mining activities in FYR Macedonia'
Bethan Hallett et al. - 'Mineralogical sources and controls of fluoride in groundwater in granitic hard rock aquifers of Andhra Pradesh, India'
Ciara Fitzpatrick et al. - 'Catchment-Scale Bromate Contamination of the Hertfordshire Chalk Aquifer'
GSL ENVIRONMENT, POLLUTION & HUMAN HEALTH. Cont.

Sally Homoncik et al. - 'Manganese Concentrations in Scottish Aquifers'
Patricia Bobeck - 'The public fountains of the city of Dijon'
W Mike Edmunds and Paul Shand - 'Groundwater – the sweet water of life'
C Scheib et al. - 'Natural and anthropogenic radioactivity of Northern Ireland; variation in gamma dose rate'
Jane Plant et al. - 'The Anthropocene and chemicals in the environment'
Timothy P Jones and Kelly A BéruBé - 'Assessing the bioreactivity of respirable volcanic ash by adsorption of biological macromolecules: a new geo-biology method'
Lata Koshy et al. - 'Geo-genomics of air and water pollution from landfills'
Ann Power - 'Historical trends of atmospheric particulate pollution deposition in northwest England'
Mireille Polve et al. - 'Characterisation of the breathable particulate material present in the air of Santiago by analysing its mineralogical and geochemical components: Impact on public health'
Sylvaine Goix et al. - 'Trace Metals Atmospheric Survey in the Mining Region of the Bolivian Altiplano (Oruro)'
Jennifer S Le Blond et al. - 'Crystalline silica exposure during the burning of silica-rich biomass'
Claire Horwell et al. - 'Cristobalite in a rhyolitic lava dome: Evolution of ash hazard at Chaitén volcano'
Mark Cave et al. - 'Assessment of the soil contribution to atmospheric particulates in the UK – Source apportionment monitoring over days years and decades'
David Pyle et al. - 'Mercury, metal and particulate emissions from volcanoes'
Jamie Lead - 'How can characterisation of manufactured nanoparticles inform ecotoxicological and environmental studies'
Deborah Berhanu et al. - 'Optimising characterisation and cell culture studies for nanoparticles - the case of MW-CNTs'
Pakatip Ruenraroengsak et al. - 'Impact of surface chemistry and size on the reactivity and toxicity of latex nanoparticles on human alveolar epithelium in vitro'
Andrew Thorley et al. - 'Mechanisms of uptake of nano-sized latex beads by human alveolar type I epithelial (ATI) cells'
Birgit Gaiser et al. - 'Interspecies assessment reveals patterns of toxicity and uptake of Ag and CeO2 nanoparticles'
Kristín Vala Ragnarsdóttir et al. - 'Earth Sciences Education for the 21st Century'

SEMINAR, MEDICAL GEOLOGY: THE IMPACT OF GEOGENIC FACTORS ON HUMAN HEALTH. KANSAS CITY MEDICAL COLLEGE, 23rd June 2009

Dr. David Elliott gave a three hour seminar to 200 second year medical students at Kansas City Medical College: The Impact of Geogenic Factors on Human Health. The students were subsequently examined on the subjects covered in the seminar, as part of a Medical Decision Making exam.

ARCHIVES OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH: INVITATION TO SUBMIT PAPERS

We invite authors in the field of medical geology to submit papers on aspects of public health and geosciences for a readership in the health sciences. *Archives of Environmental and Occupational Health* is a venerable journal in the field of environmental health, celebrating its 90th anniversary in 2010. Although it has changed names several times, it is one of the oldest continuously-published peer-reviewed journals in the field. For the last 30 years, *AEOH* has been published by Heldref Publications, a private foundation, but it has just been acquired by Taylor and Francis, a major scientific publisher based in the UK. *AEOH* is now experiencing an expansion. The core readership and contributor base of *AEOH* includes environmental scientists, public health practitioners, epidemiologists, health professionals, exposure assessment professionals, and occupational hygienists. Please visit our current webpage for authors: [http://www.heldref.org/pubs/aeoh/about.html](http://www.heldref.org/pubs/aeoh/about.html) for instructions on submission.

Tee L. Guidotti, Editor in Chief
3rd HEMISPHERIC CONFERENCE ON MEDICAL GEOLOGY, MONTEVIDEO, URUGUAY. 12 – 16th OCTOBER 2009

A successful conference was held, with many interesting papers presented. Details of the conference, including the program and abstracts of the talks can be found at: http://www.geologiamedica.com/

IMGA Distinguished Service Awards 2009

The IMGA Distinguished Service Award for exemplary service to IMGA and to Medical Geology was presented for the first time at the Third Hemispheric Conference of Medical Geology in Montevideo, Uruguay, October 2009. The award was presented to three dedicated scientists from South America, a rapidly expanding region of medical geology who have done much to promote medical geology (see front page for photos):

Cássio Roberto da Silva (Brazil), Prof. Dr. Nelly Mañay (Uruguay), Sandra Londono (Colombia) (see front page for photos)

See next page for poster and presentation awards.
3rd HC ON MEDICAL GEOLOGY: POSTER AND PRESENTATION AWARDS

Two (2) JEM awards to best poster presentations, handed out by Dr. Centeno
Poster Nº 35, pg 45. Metal fractionation in topsoils from the Marrancos gold mineralisation, Northern Portugal.
Amélia P. Reis 1, Carla A. Patinha 1, Eduardo A. Ferreira da Silva 1, António J. Sousa 2, Carlos A. Guimarães 2, Maria E. Martins 1 and Pedro M. Nogueira 1
1. GEOBIOTEC, University of Aveiro, Campus de Santiago, Aveiro, 3810-193, Portugal;
2. CERENA, Technical Superior Institute, Av. Rovisco Pais, Lisbon, 1049-001, Portugal
Poster Nº 032, pg 45. Copper deficiency in grass in the region of Salto (Uruguay), potential cause of “growth syndrome” in cows
V. Brune 1, I. Viera 1, G. Facchin 1, E. Kremer 1, J. Irigoyen 2, M. H. Torre 1
1. Química Inorgánica (DEC), Facultad de Química, UDELAR, Uruguay.
2. Regional Norte, Facultad de Veterinaria, Uruguay.

Two (2) ACT Dictionaries awards to poster presentations, handed out by Dr. Finkelman
Poster Nº 90, pg 50. Volcanic activity and its environmental effects in Chile
Adolfo R. Börge 1, Karen J. Börge 1
1. Geografía, Universidad Academia de Humanismo Cristiano, Chile.
Poster Nº 40, pg 46. Environmental Geochemistry of Tucano Garimpão, Monte Alegre de Goiás, Brazil
Authors: Luciana Gonçalves Tibiriçá 1, Cláudia Valéria de Lima 1 and Nilson Francisquini Botelho 2
1. Instituto de Estudos SocioAmbientais, Universidade Federal de Goiás, Goiânia, Brazil;
2. Instituto de Geociências, Universidade de Brasília, Brasília, Brazil.

IMGA Award to student oral presentation (“Essentials on Medical Geology” book) handed out by Dr. Centeno
Oral Presentation Nº 73, pg. 41. The Mineralogical Composition of House Dust in Ontario, Canada.
Authors: Michael H. Woldemichael 1, André E. Lalonde 1, Pat E. Rasmussen 1, 2
1. Department of Earth Sciences, University of Ottawa, Ottawa, ON, Canada K1N6N5 ON, Canada K1A 0K9.
2. Exposures and Biomonitoring Division, HECS Branch, Health Canada, Ottawa
## UPCOMING CONFERENCES, WORKSHOPS AND MEETINGS

### EGU MEETING, VIENNA, 2-7 May 2010

- Heavy-metal contamination of water, air, soil, and foodcrops
- Urbanisation impacts upon sediment and soil systems
- Urban Soils
- Radon health and natural hazards

Abstracts by latest 18 January 2010

### THIRD INTERNATIONAL CONGRESS ON ARSENIC IN THE ENVIRONMENT, TAIWAN, 17-21 May, 2010

At the National Cheng Kung University (NCKU), Tainan, Taiwan


### GOLDSCHMIDT CONFERENCE, KNOXVILLE, TENNESSEE, 13-18 June 2010

- Urban Geochemistry and other topics
- Uranium in the Environment
- Hydrogeochemistry

Abstracts by latest 21 February 2010

### 10TH INTERNATIONAL MULTIDISCIPLINARY SCIENTIFIC GEOCONFERENCE & EXPO SGEM 2010. MODERN MANAGEMENT OF MINE PRODUCING, GEOLOGY AND ENVIRONMENTAL PROTECTION, BULGARIA, 20-25 June, 2010

Information: Secretariat Bureau; 14, "Kliment Ohridsky" Blvd. 1797 Sofia, BULGARIA

Phones: +359 2 975 3982 (+ voice mail box); SGEM SKYPE name: SGEM Office Fax: +359 2 817 2477

E-mails: sgem@sgem.org or sgem@stef92.com


Abstracts by 10 March 2010

Full paper Submission 10 May 2010

Poster Submission 20 May 2010
This conference is co-organized by the National University of Ireland, Galway (NUI Galway), the Environmental Change Institute (ECI) and the Health Service Executive (HSE) West, Ireland. The International Medical Geology Association (IMGA) will hold a workshop at this conference. More information is available on the website: [http://www.nuigalway.ie/segh2010/](http://www.nuigalway.ie/segh2010/)

You are invited to submit an abstract to SEGH 2010 International Conference and Workshops of the Society for Environmental Geochemistry and Health (SEGH, [www.segh.net](http://www.segh.net)) on Environmental Quality and Human Health, which will be held in Galway, Ireland during June 27-July 2, 2010.

This conference and the workshops provide an internationally leading forum for interaction between scientists, consultants, and public servants engaged in the multi-disciplinary areas of environment and health. Participants of the conference represent expertise in a diverse range of scientific fields (such as biology, engineering, geology, hydrology, epidemiology, chemistry, medicine, nutrition, and toxicology), as well as regulatory and industrial communities. There is a special honorary session for the lifetime achievement award to Prof. Iain Thornton. In addition, the International Medical Geology Association (IMGA, [www.medicalgeology.org](http://www.medicalgeology.org)) has a short course and a session in SEGH 2010.

Galway, located in the west of Ireland, is one of the most popular tourist destinations in Europe and attracts more than 1 million international tourists annually. It is easily accessible, with frequent direct flights to and from several cities in the UK. There are also frequent air, train and bus connections with Dublin. I look forward to seeing many of you in Galway, Ireland!

Best regards,

Chaosheng Zhang

**PROGRAM**

June 26 (Saturday): Pre-conference excursion
June 27-28 (Sunday-Monday): Medical Geology Short Course
June 29-July 1 (Tuesday-Thursday): SEGH Conference and Workshops
July 2 (Friday): Fieldtrip 4

*Complete information at: [http://www.nuigalway.ie/segh2010](http://www.nuigalway.ie/segh2010)*
Dear Colleagues and Friends on Medical Geology:

On behalf of the International Medical Geology Association (IMGA) and the Italian Chapter on Medical Geology, we are pleased to announce the 4th International Conference on Medical Geology (4th ICMG) which will be held in Bari, Italy, during the week of September 20-25, 2011, at the Sheraton Congress Centre. We are delighted to announce Prof. Dr. Saverio Fiore, Head of the Laboratory of Environmental and Medical Geology at IMAA-CNR, as the General Chairman for this conference.

The 4th International Conference on Medical Geology is being organized under the theme of “Geological and Medical Sciences for a Safer Environment”. Information on Call for Abstracts, Call for Sessions, Pre-Conference workshops and short courses, etc will be available starting on January 10, 2010 at the conference website at www.geomed2011.it.

On behalf of the organizers and sponsors for GEOMED2011, we look forward to welcome you to Bari, Italy, and to share with you what promise to be a highly scientifically stimulating and memorable event.

Sincerely,

Dr. Jose A. Centeno, Chairman, IMGA
INTRODUCTION
Mosul city is considered to be part of the Goiter epidemic area in Iraq. It is believed that a lack of dietary iodine is a significant factor in getting this disease, one of the symptoms of Iodine Deficiency Disorder (IDD). The contribution of water to dietary iodine is a debatable subject, where water with a low iodine content may indicate an iodine deficiency in the local environment. This indicates the importance of investigating the iodine distribution pattern and underlying factors affecting its behaviour in different types of natural water. This goal shapes the present study.

Mosul is the largest city of northern Iraq, and is located in the upper reaches of the Tigris river, which divides the city into right and left banks. It is surrounded at a distance by a few geological structures, represented by Bashiqa, Ain Safra, Hammam Al-Aliel, Atshan, Alan, Alquosh and Ain Sifny. The area of the city is characterized by the presence of longitudinal faults running approximately parallel to the river, such as the Mosul-Hammam Alieel and Hawy Alchenisa faults, which control the general direction of flow of the river within the city and its suburbs. Exposure of the lagoonal Fat’ha Formation (middle Miocene) is noticeable and forms the relatively high ground on the right bank because of the strike-slip (vertical displacement), whereas different thicknesses of river terrace sediment are found on the river banks. Mineralised springs appear in two main localities namely Ain Kibreat and Hamman Al Aliel on the right bank.

The weather of the city and surrounding area is dominated by the arid and semi-arid climate of the region. Winds blow in different directions during different seasons, but those that blow to the east and north east affect rainfall as well as the formation of atmospheric dust and dust storms, since the city is located at the rim of a dry and desert area.

Seventy six samples were selected to represent water resources available in the city and suburbs. Certain procedures were used to sample rain, Tigris river, ground and mineralized spring water.

ANALYTICAL PROCEDURES
All samples were subjected to spectrophotometry to determine the concentration of iodine (I\textsubscript{2}) and iodide (I\textsuperscript{-1}). In brief, the analytical method includes first, chloroform extraction of iodine leaving iodide in the aqueous layer. The iodine of the organic layer was extracted by treatment with distilled water containing 5% NaHSO\textsubscript{3}, by which treatment, all iodine was transformed to iodide. The iodine in the two cases was analysed through oxidation with an excess of bromine water and the excess removed by treatment with formic acid. Potassium iodide was added as reducing agent to liberate iodine, which was determined by the spectrophotometric method of the tri-iodide complex with starch. This method is precise and sensitive and the relative errors amount to 3%.

ANALYTICAL RESULTS
Rain Water: The distance from the sea is an important factor affecting the iodine level in rain water. The nearest coast to Mosul city is the Arabian Gulf, about 1000 km away, and other seas such as the Mediterranean, Black and the Caspian Seas are at an even greater distance. This explains the decrease in the average total iodine of 0.396 µg/ml in the rainfall on Mosul city for the interval October 1999 – March 2000, in comparison to 2.2 µg/ml for the total iodine in rainfall over the UK countryside. Despite such differences, the rainfall on both regions is similar in the relative enrichment of the iodide content. However, the UK rainfall also contain iodate, which has not been detected in the rainfall over Mosul city. This may reflect differences in the environmental conditions of the air space of the two regions. Atmospheric dust may control the variation in the total iodine content of the rainfall over Mosul city. The total iodine content amounts to 0.65 µg/ml in the first rain of the
season and then shows a general decrease until it reaches 0.27 µg/ml in the last rain at the end of the season. Such a variation pattern suggests a washing of the accumulated dust particles until the first rain, then dust particles decrease in amount as this continues until it reaches the lowest amount at the end of the season. The rainwater (wet deposit) and dust fall (dry deposit) have an important role in iodine transportation for the atmosphere to the supergene environments (soil and surface water). Calculations show the secondary importance of the wet deposit (0.05 µg/ml) in comparison to Johns, 1981, in Fuge, 1986, dry deposit (3.25 µg/ml) at Mosul city and its suburbs. Such a variation pattern in wet and dry deposits characterizes the arid and semi arid region, however it may be inverted in wet regions like the UK.

Mineral Spring Water: Mineral springs are present along the Tigris river at Mosul city in the north to the Fat’ha region in the south. It is believed that the springs are associated with genetic processes of sedimentary sulfur (elemental sulphur has been produced from native sulphur deposits of the Fat’ha formation at Mishraq Sulphur Field, about 40 km south of Mosul city, using the Frasch process).

The most famous mineral springs at Mosul city are those at Ain Kibrit and Hammam Al Aliel (Fasosa, Shamoun, Zahra north and Zahra south) on the western bank of the Tigris river. The discharge of mineral water to the river from springs, is less usual, because most of the springs are underwater (Baghdadi, A. I., 1973). In comparison with other mineral springs elsewhere, the increase in total iodine content (0.638 µg/ml) in such mineral water may reflect the extent of washing of hydrocarbon materials and marine rocks at depth under high temperature and the presence of reducing conditions evidenced by the presence of sulphur in concentrations more than 2 nano molar. The seepage of mineral water and mixing may change the chemistry (total iodine content) of river water flow near the western bank as described below.

Tigris River Water: Analytical data shows a slight but detectable increase in average total iodine (0.470 µg/ml) in water near the right bank relative to the left bank (0.431 µg/ml) because of mixing with mineral water. Photo–chemical oxidation results in an increase of iodine content relative to iodide at the water surface layer of the Tigris river. Despite difficulties associated with the calculation and uses of a statistically significant average of total iodine, a comparison shows an increase in the average total iodine (0.44 µg/ml) in water of the Tigris river within Mosul city and its suburbs, for which there are several possible explanations. River water flows over rocks and sediments of marine origin such as limestone of Middle Miocene Fat’ha formation. The wet (0.05 mg/m²/year) and dry (3.26 mg/m²/year) deposits may contribute to the addition of total iodine to water of the Tigris river and the lake of the Mosul dam at the upstream end of the Tigris river. In addition to this, pollution may contribute to the problem by the discharge of urban, industrial and agriculture wastes, which may explain the increase in average total iodine in water, from 0.30 µg/ml as it enters the city, to 0.58 µg/ml as it exits Mosul City. A low level and slow flow of river water may contribute to the increase in average total iodine.

Ground Water: The isolation of ground water from the effects of the surface environment leads to a decrease in the oxidation rate of iodide and an increase in average iodide content to 0.301 µg/ml and 0.276 µg/ml, compared to an iodine content of 0.221 µg/ml and 0.215 µg/ml, in ground water wells on the right and left banks, respectively. The aforementioned data also show an increasing trend in the average iodide and iodine content in water of the right bank wells compared to those of the left bank. The presence of limestone of the Fat’ha formation and mineral springs at the western bank may explain such a trend.

Iodine Geochemical Fences: An abundance of iodine in any environment does not necessarily indicate high available iodine. This is the case for Mosul city. Geochemical Fences can adversely affect iodine mobility within a single environment and between the different environments. Such factors include sulfide barriers in surface water and alkaline, organic matter, clay, and iron and manganese oxides in soil, sediments and sedimentary rocks. The term “geochemical
fence” is used here to indicate the presence of available iodine on one side and unavailable iodine on the other side of the fence. For example, the presence of sulphide in aquatic environment represents a barrier for iodine. It is thought that such barriers are in fact causative factors in the incidence of Goiter or Iodine Deficiency Disease at Mosul city.

REFERENCES

THE STUDY OF PATHOLOGICAL BIOMINERALS OF THE HUMAN BODY: COMPOSITIONAL FEATURES AND THE IMPACT OF ENVIRONMENTAL FACTORS ON KIDNEY STONES FROM BASILICATA (SOUTHERN ITALY)
Maria Luigia Giannossi Laboratory of Environmental and Medical Geology, IMAA-CNR, Tito Scalo (PZ), Italy. Note: This scientific activity is a Ph.D. Thesis. Dott. Vito Summa (IMAA-CNR, Italy) and Prof. Giovanni Mongelli (Basilicata University) were the thesis’ tutors.

OBJECTIVE
To analyze the geo-environmental factors that can influence the formation of kidney stones and to identify the main types of kidney stones to be found in Basilicata, through a chemical-mineralogical and petro-morphologic study.

MATERIALS AND METHODS
A three-year-long epidemiological study was carried out to identify the prevalent nephrolithiasis. A representative sample of the Basilicata inhabitants hospitalized at “San Carlo” in Potenza was chosen to find out their dietary and behavioural habits with a questionnaire during the observation period. A series of statistical analysis was necessary to determine the measures of association (odds ratio) useful for verifying a possible relationship between the distribution of kidney stones in the region and geo-environmental risk factors.

A morphological and compositional characterization together with the use of integrated techniques, optical and scanning electron microscopy and X-ray powder diffraction, was performed on more than 80 kidney stones collected in three years. Some thin petrographic sections were obtained for a representative number of bigger kidney stones. The amount of some chemical elements specifically involved in the kidney stone crystallization process (Ca, Mg) or potentially toxic (Pb, Cr) was found by optical and atomic absorption spectrometry.

RESULTS AND DISCUSSION
The geographic epidemiological survey showed the regional nephrolithiasis distribution (average 6.49‰) and the areas particularly at risk from demographic, environmental and behavioural factors.

The prevalence is higher among men (7.12‰) than women (5.89‰), increases with age, and is higher for men between 40 and 59. The prevalence rate sharply increases when compared to the regional average, to values above 11‰ for the Potenza Health Authority (ASL n.2). The municipalities with a prevalence of kidney stones are in the central north-western region (Apennine area).

Low temperatures, high altitude, low solar radiation and some soil characteristics are risk factors which could explain the degree of prevalence found, all of them influencing the Basilicata inhabitants’ lifestyle. A positive correlation between the development of kidney stones and the consumption of hard water (>22.5°F) is also found.

Characterization of the kidney stones showed that the Lucanians are mostly affected by those with a predominant component of calcium oxalate (59%). Among these the most common are made of weddelite (29%) formed in renal cavities. The presence of a high percentage (11%) of papillary kidney stones consisting of whewellite developed on the kidney wall also needs considerations. Whewellite devel-
opned on kidney walls has bigger unit cell dimensions than those made in renal cavities. There are usually more cores within whewellite kidney stones, which are the result of several simultaneous nucleation and growth processes.

The external features of kidney stones are associated with the type of stone and also reflect their internal structure. The presence of mixed stones is high (> 50%). A new type of kidney stone made of weddel-lite mixed-struvite was found.

A comparison between the regional and international prevalence rates (in the absence of national data) leads to interesting observations:

• The prevalent kidney stones appear to be those composed of calcium oxalate;
• In the Basilicata community there is a larger number of uric acid kidney stones (18%) and a lower number of calcium phosphate, that may be related to specific risk factors mainly dietary habits such as an excessive consumption of proteins and a consumption of soft water with a low bicarbonate content which does not facilitate urine alkalinisation.

This could explain the geographical distribution of the uric acid kidney stones found exclusively in the northern region, an area with predominantly soft water and characterized by a low solar radiation and average temperatures lower than the rest of the region. These factors do not facilitate either fluid intake or a higher calcium absorption.

Regarding the distribution of trace elements in calcium oxalate kidney stones the content is greater in the wedellite than in whewellite. The former is the first hydrate phase that forms during the crystallization process and then becomes whewellite. During this process the trace elements released from wedellite are not considered in the new structures.

The higher presence of lead in inorganic kidney stones and its total absence in those of uric acid and cystine can be found in other studies. The presence of Pb is strongly related to environmental pollution. Toxic elements such as lead and chromium (80% of the amount absorbed is excreted in urine) may be triggers of disease affecting renal papilla, and the slightly higher content of the two elements in papillary whewellite kidney stones needs consideration.

The results showed that some elements have a much higher concentration than the average contribution resulting from daily diet. In the light of this, it can be assumed that these elements have a different origin and play an important role in the biomineralization process in association with both inorganic and organic phases. This issue will require in-depth experiments in vitro.

CONCLUSIONS
This is the first example of an Italian study of kidney stones carried out at a regional level with a multidisciplinary approach, which has made possible significant achievements in the field of human health protection.

The chemical-mineralogical and petro-morphological analysis, performed with integrated techniques on a large number of kidney stones, allowed information useful for identifying the prevalent stone types and defining some geo-environmental risk factors to be gathered. In addition, a petrographic and mineralogical investigation into stones made the nucleation and growth processes clearer, especially for calcium oxalate kidney stones.

These morpho-compositional data are useful for classifying each type of kidney stone, and, therefore, each patient in more than 30 different subgroups can be characterized by specific etiologic factors necessary to determine the treatment and disease prevention, especially in the presence of mixed stones requiring proper intervention for each mineral phase that is present. Kidney stones, being so widely spread in many types of stone, can be considered as markers for the evaluation of the presence of trace elements, especially those potentially toxic, in the human body as well as in the environment.

Several kinds of kidney stones with a new mineral assemblage have been found and this represents a further step forward in understanding this widespread disease and stimulates further research.
SEDIMENTARY GEOCHEMISTRY OF MANGANESE IN RELATION TO PARKINSON DISEASES (PD) AT SELECTED AREAS OF IRAQ.

Dr Salim M. A. Aldabbagh¹ Mr. Flyah H.A.Al-Khatony
1. Earth Sciences Department, College of Science, The University of Mosul, Ninevah, Iraq.
Drsalim_aldabbagh@yahoo.com

EDITOR’S NOTE
Reviewers have commented that the medical geology of manganese is very much a matter of current interest, and that the link between manganese and Parkinson’s disease is still a matter of debate. The reader is referred to the article, Manganese in Drinking Water by Karin Ljung, Marie Vahter, and Marika Berglund at http://ki.se/content/1/c4/91/50/Manganrapport2007.pdf for further information on the role of manganese.

INTRODUCTION
Medical geology is developing rapidly in developed countries and, although still at the cradle stage in less developed countries, its practice there is relatively free of anthropogenic pollution problems. The concerns of medical geology attract the attention of multi-disciplinary scientists and the public medium equally. One of the issues that has received wide concern is the role of manganese in the etiology of human brain disease, known as Manganese Madness.

Manganese is a widely distributed minor element in the earth’s crust. The supergene behavior of manganese is studied on the basis of crystal field theory, colloid concepts, physico-chemical properties and the role of biology and organic geochemistry. Dry and wet deposits of manganese are determined by regional geology, pedology and meteorology.

Manganese is an important nutrient element for both plant and animal life. Captain Mathew Flinders’ voyage around Australia in 1803 is considered a benchmark in any discussion of manganese in relation to human health and Parkinson Diseases (PD). A view that is held is that the increase in manganese up-take leads to PD cases. The present study is concerned with the sedimentary geochemistry of manganese in the Mosul area and a comparison is made with relevant data for the Basra area in relation to statistics of PD cases.

ANALYTICAL PROCEDURES
The analytical procedure for the determination of mobile manganese includes the treatment of 1.0 gm of minus 65 mesh of a powdered sample of sediment (soil) and sedimentary rock with 50 ml. of 25% v/v of glacial acetic acid using a mechanical stirrer for one hour. The mixture is filtered through Whatman No. 3 filter paper. A volume of 25 ml. of filtrate is transferred to a 100 ml. beaker and 2 ml. of conc. Nitric acid, 5 ml. of 85% v/v phosphoric acid and 0.3 gm of potassium periodate is added. The beaker is covered with a watch glass and the solution is heated to boiling and heating a continued for 5 minutes after the appearance of permanganate colour. After cooling to room temperature, the solution is transferred to a 50 ml. volumetric flask and made up to the mark with distilled water. Absorption measurement is made at 520 nm against blank using UV and visible spectrophotometer type CECIL 1021, 1000 series. The Manganese concentration (ppm) is calculated using a carefully prepared calibration diagram.

Water samples are first subjected to evaporation to concentrate the manganese content to a detectable level, usually by the evaporation of 4250 ml. down to 60 ml. 35 ml is then transferred to a 100 ml. beaker and 5 ml. of conc. sulfuric acid, 1 ml. conc. nitric acid, 2 ml. of 85% v/v phosphoric acid and 0.25 gm potassium iodate added. The beaker is covered with a watch glass and heated to boiling, after which the procedure is similar to that for the solid sample.

DISCUSSION
Miocene rocks are widely exposed in Iraq and samples have been selected to represent the rock units of the lagoonal Fat’ha and fluvial Ingana formations. Limestone, and green and red marl, containing 318, 273 and 193 ppm mobile manganese respectively, whereas no mobile manganese is detected in gypsum. Carbonate–rich sandstone, siltstone and claystone contain 727, 357 and 353 ppm mobile manganese respectively. Carbonate minerals play a major role and to lesser extent, iron phases, clay minerals and other
weakening phases, in the discussion of mobile manganese distribution in the Miocene rocks.

Soil samples from a highly cultivated area were selected from Al-Hamdania, about 30 km east of Mosul city in northern Iraq, where the soil is thought to be derived from rocks of the Injana formation. Mobile manganese in twelve Al-Hamdania samples ranged from 93 to 216 ppm with an average value of 155 ppm. The second group represents Mesopotamia fluviatile sediment. Twelve samples were selected from around Basra city, namely the Zubair, Safwan and Germit Ali areas and mobile manganese ranged from 61 to 177 ppm with an average value of 112 ppm.

Mobile manganese generally increases with depth for most of the selected pedons. A comparison of the data shows many influential factors in the distribution of mobile manganese in the soil of both areas, and therefore, it is difficult to obtain a significant average value for any given area. However, an appreciable difference is noticed between the average value in Al-Hamdania soil (155 ppm) relative to soil around Basra city (112 ppm) which may lead to a lower manganese content in soil crops around Basra city.

Since Iraq is located at the fringe of the desert, a relatively high and variable rate of dust fall may be expected. The average dust fall in the Al-Ba’aj area (100 km. west of Mosul city) was 12.5 gm/m²/month in October 2001, while in March 2002 the rate decreased to 1.3 gm/m²/month. The yearly average dust fall varies in the urban area, e.g., Mosul city (13.6 gm/m²/month in 1998), relative to the rural area, e.g. Al-Ba’aj (7.17 gm/m²/month in 2001/2002). An increase in the rate of dust fall, as well as dust coarsening, is expected in the southern parts of Iraq. In 2001/2002, the dry deposit of mobile manganese in the Al-Ba’aj area amounted to 1.19 gm/m²/month and is associated more with the finer size fractions (<63 micron). The manganese content of the monthly rain-fall is in harmony with the monthly dust fall of the Al-Ba’aj area. This suggest that rain acquires its manganese content by interaction at the dust grain-droplet interface. The average wet deposit of manganese in the Al-Ba’aj area amounts to 0.51 gm/m²/month, i.e., less than half of the dry deposit, which emphasizes the semi-arid and arid climate of Iraq.

The mobile manganese content in fifteen samples of Tigris river water ranged from 7 to 18 ppb with an average value of 11.5 ppb, in comparison to 20 ppb for the Yangtze river and 25 ppb for the Yellow river in China, and 8 ppb for the Hudson river in the U.S.A. Tigris and Euphrates river waters are thought to contain a similar manganese content, because the two rivers originate from similar hydrological/hydrogeological systems and pass through similar geology before they merge into the Shatt El Arab, which discharges its water into the Arabian gulf at the Iraqi port of Fao. A few sulfide springs may add a little bit of manganese to the Tigris and Euphrates river waters at Mosul, Fatha and Heite area respectively.

The treatment of raw water at Mosul pumping stations leads to a slight reduction in the average manganese content from 11.5 ppb to 10.9 ppb. Oxidation to manganese insoluble phases is expected as a result of chlorine addition. The water supply to Basra city contains a higher manganese content (13.4 ppb) than to Mosul city (10.9 ppb), but the two values are within the acceptable limit of 50 ppb.

The PD statistics of Mosul and Basra cities do not require normalization as the two cities have similar populations of about 1.5 million. The statistics for the years 1985-2000 show a lower number of patients at Basra (412) relative to Mosul (826), which holds true for different sexes and for all age groups (<1-14, 15-44, >45 years). Such statistics could be accounted for by the lower manganese content in crops in the regular diets of the inhabitants, but the higher manganese content of the Basra water supply does not explain the aforementioned statistics. However, electrical conductivity measurements (EC) show a higher average value (more than double) for the Basra water supply (960 mohs/am) relative to Mosul (385 mohs/am). The calcium ion is the major cation contributor to EC measurements. A higher calcium content in the water supply to Basra city inhibits manganese absorption and introduction into human biological cycle, hence lowering the number of PD patients in Basra city.
MEDICAL GEOLOGY NEWSLETTER EDITORIAL POLICY AND INSTRUCTIONS TO AUTHORS

Editorial policy and instructions to authors have been published in previous newsletters, usually in a shortened form. Following discussions amongst the officers of IMGA, these have been updated as follows.

OBJECTIVE
To publish a newsletter on Medical Geology, containing papers, articles, book reviews, accounts of conferences & workshops, etc., upcoming meetings, and interesting short pieces of news and information.

FREQUENCY OF PUBLICATION
Twice a year, published in June and December.

NEWSLETTER CONTENT
Submitted material should be relevant to the objective of Medical Geology. Whilst this is a broad subject, the objective of IMGA should be kept in mind:

Medical Geology is defined as the science dealing with the relationship between natural geological factors and health in man and animals, and understanding the influence of ordinary environmental factors on the geographical distribution of such health problems.

Submitted material that does not meet this objective will not be accepted for publication. Examples of such material are items that do not address the scientific aspects of medical geology or that are of a purely geological, chemical, or medical nature, etc. Brief contributions on student projects are welcome. Consideration will be given to thematic issues.

The language of publication is English, and articles should not usually be more than six pages in length including figures and tables. Longer articles may be considered but authors may be asked to submit a shorter version. Authors should consider that, given the broad scope of medical geology, it might be useful to include a brief explanation of material or of abbreviations that may not be familiar to readers.

Articles should not have been published previously. Summaries of previously published articles may be acceptable, but the editor should be advised, and a reference must be provided to the original publication. Submission of an item implies the assignment of a non-exclusive copyright to the IMGA. It is the author’s responsibility to ensure that there are no copyright violations.

The general structure of a newsletter is as follows, but may vary because of space and layout limitations:

- Front cover with contents
- Message from the Chair
- News from Chapters/Regions
- Conferences, workshops, courses
  - Reports on past conferences etc.
  - Upcoming conferences, etc.
- Articles
- Miscellanea
- Back cover (varies but usually a stand-alone topic)
EDITORIAL REVIEW
Although articles submitted for previous newsletters have been reviewed informally and edited for clarity and length, the newsletter is not a formally refereed publication. However, following discussions amongst the officers of IMGA, it has been decided to adopt a more formal review process by submitting items to a review panel, as a result of which, an author may be requested to revise a contribution. If this results in substantial changes, the author will be requested to review the edited version prior to final acceptance.

The Editor’s decision not to accept an item for publication in the newsletter will be based on advice from the review panel and will be final.

INSTRUCTIONS TO AUTHORS
The language of publication is English and authors should note that this includes captions on figures, axes labels on graphs, etc. Many of our valued contributors do not have English as a first language, and the editor will work with them to prepare an article for publication.

The submission format for text is Times Roman 12 pt, single spacing, in Word 2000 (note that users of Word 2007 can save in a format that is compatible with Word 2000).

Graphic material and tables:
- May be submitted in colour and will be published in colour, if possible. However, since this is not always possible, authors should ensure that they would also be fully legible in black and white.
- Material may be reduced in size for publication, and authors should ensure that it is designed to remain readable when reduced.
- Graphics formats that are compatible with MS Word 2000 are acceptable. Preferred file types are .jpg, .bmp, .gif, .wmf (Windows Metafile).
- Captions should be separate from the figures.
- Figures should not be combined (e.g., two or more graphs/maps/tables should be separate and not be in the same file)
- Axes should be clearly labelled (and in English), units should be given, maps should have scales, etc.

Authors should limit references and tables to the essentials and if they wish to provide more extensive material, ask readers to contact them for more complete information. All articles should contain the author’s contact information.

All material should be submitted to the editor no later than four weeks before the publication date:

<table>
<thead>
<tr>
<th>Newsletter</th>
<th>Submission deadline</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Newsletter</td>
<td>May 15th</td>
<td>June 15th</td>
</tr>
<tr>
<td>Winter Newsletter</td>
<td>November 15th</td>
<td>December 15th</td>
</tr>
</tbody>
</table>

Authors are encouraged to submit their material well in advance of the deadline for an edition. Even if submitted before a deadline, an item may be delayed until a following edition if extensive editing is required. Contributions received after the deadline may be included, but will generally be delayed until the following edition.
SUBMISSIONS
Contributions should be sent as much before the deadline as possible, preferably to the editor’s home address:

Dr. David C. Elliott, Newsletter Editor
3507 Boulton Rd. NW, Calgary, Alberta T2L 1M5, Canada.
Home (403) 220 1853 Work (403) 297 4008
davide5@telus.net David.Elliott@seccom.ab.ca

INTERNATIONAL MEDICAL GEOLOGY ASSOCIATION


EXECUTIVE COMMITTEE
Chair: Dr. Jose Centeno, Armed Forces Institute of Pathology, USA. centeno@afip.osd.mil

Co-Chair for geoscience: Dr. Olle Selinus, Geological Survey of Sweden. Olle.selinus@sgu.se (office)
Olle.selinus@gmail.com (home)

Co-chair for medical science: Philip Weinstein, University of Queensland. p.weinstein@uq.edu.au

Secretary: Dr Kimberley Chisholm, Manukau Institute of Technology, New Zealand. kimberley.mcauley@gmail.com

Treasurer: Dr David Slaney, Institute of Environmental Science and Research Ltd (ESR), New Zealand david.slaney@esr.cri.nz

Councillors:
Bernardino Ribeiro de Figueiredo (Geologist, Brazil), berna@ige.unicamp.br
Fiona Fordyce (geochemist, UK), f.fordyce@bgs.ac.uk
Dr Maxwell Mwase, mwase09@yahoo.co.uk
Prof. Hisashi Nirei, Japan, nireihisashi@msn.com
Professor Umran Dogan, Turkey, umran-dogan@uiowa.edu
Prof Nelly Manay, Uruguay, nmanay@fq.edu.uy

Newsletter Editor: Dave Elliott, Canada, davide5@telus.net