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MEDICAL GEOLOGY NEWSLETTER

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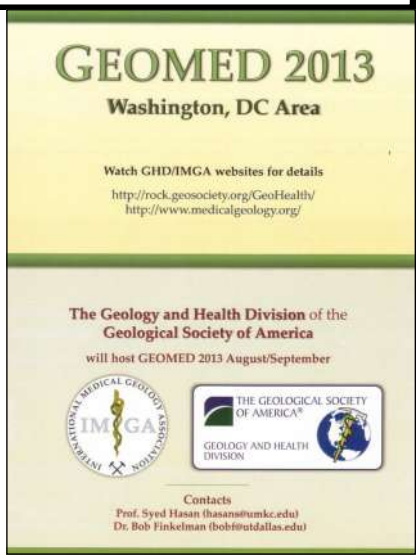
4TH INTERNATIONAL CONFERENCE ON MEDICAL GEOLOGY. *GEOMED2011*

BARI, ITALY September 20-25, 2011

CONFERENCE REPORT P. 23
AWARDS P. 25

Saverio Fiore, Chairman of the 4th International Medical Geology Conference, GEOMED 2011 (left) and Chair, IMGA, Jose A. Centeno (right)



GEOMED 2013 Student travel fund see page 47.

HIGH LEVEL OF IMGA ACTIVITY:

EXTENSIVE CHAPTER REPORTS, PAST EVENTS (INCLUDING GEOMED 2011) AND UPCOMING EVENTS.

Inside this issue:

MESSAGE FROM THE CHAIRMAN

Dear Friends and Colleagues,

It has been an honor, privilege, and pleasure serving as your Chair these past two years and I look forward with enthusiasm to my new term. Despite the widespread economic and political uncertainties, 2011 was a remarkable year for Medical Geology and for the International Medical Geology Association (IMGA). Among the highlights for 2011 was that our paid membership grew to 316. Also, the number of IMGA Chapters has increased significantly, including the 250 member Geology and Health Division of the Geological Society of America, and still other chapters are in the process of forming. Certainly one of the highpoints for our Association was the highly successful 4th International Conference on Medical Geology (GEOMED 2011) held in Bari, Italy, which attracted the participation of over 280 participants from over 50 countries. You can find other accomplishments of the Association in this Newsletter and on our web site. With these successes in mind I want to express my personal appreciation and the appreciation of the Association to Phil Weinstein, the outgoing Co-chair for medical science and the outgoing councilors, Umran Dogan, Fiona Fordyce, and Nelly Manay for their dedicated service and commitment to IMGA. At the same time I wish to welcome Nelly Manay, the incoming Co-Chair for medical science and incoming councilors Maria Armienta, Mark Cave, and Chaosheng Zhang, who will join the Executive Committee and help to continue the upward trend of the IMGA. I am also delighted to announce the appointment of our dear friend Bob Finkelman as our new Senior Advisor for IMGA. Bob's lifetime numerous contributions to our Association have been key in developing medical geology worldwide, and we are looking forward to many more years of outstanding work on his new position as Senior Advisor to our Association.

The Association is particularly indebted to Prof. Saverio Fiore and his colleagues for the fantastic job they did in organizing the wonderfully successful International Conference on Medical Geology (GEOMED 2011) in Bari. Saverio and his colleagues have, once again, raised the bar and set a new standard for future Medical Geology conferences.

Although progress has been made, much more can be done to serve the needs of the growing Medical Geology community. I, therefore, call on you to step up and volunteer your services to the Association by contacting me to indicate which committee you would like to serve on.

Additionally, please make plans to attend the next IMGA conference which will be held in the fall of 2013 in the Washington, D.C. area, which is being organized under the leadership and guidance of Prof. Syed E. Hasan and Bob Finkelman. The conference will be hosted by our Honorary Chapter – the GSA Geology and Health Division and will be co-hosted by the U.S. Geological Survey. Progress of the conference will be posted on our web site at regular intervals. Also, please consider contributing to the newly established student travel fund. The fund will help defray the costs of deserving medical geology students who wish to attend the conference. By the way, we have already received two exciting proposals for the 2015 medical geology conference. With your help the next several years could be even more productive than this past year.

Finally, as we approach the end of what has been a remarkable year for IMGA, I will like to take this opportunity to thank you all for your continuing commitment, support and contributions to IMGA. I wish you and your families happy Holiday Season, and a joyful and prosperous New Year 2012.

Respectfully,

Jose A. Centeno
Chairman, International Medical Geology Association

IMGA EXECUTIVE COMMITTEE
The current Executive Committee, which serves until the end of 2011 is:

Chair, Jose A. Centeno, PhD, FRSC
Chief, Division of Biophysical Toxicology
The Joint Pathology Center, Depleted Uranium and Embedded Fragment Laboratory
Malcolm Grow Medical Center
1057 West Perimeter Road, Bldg 1050, Room GB-33
Joint Base Andrews Naval Air Facility Washington, MD 20762
Phone (Office): (240) 857-6882;
Email: Jose.Centeno@afncr.af.mil, tonycent@comcast.net

Co-Chair for geoscience: Olle Selinus
Linneaus Universtity
Kalmar, Sweden
Olle.Selinus@gmail.com

Co-chair for medical science: Philip Weinstein
School of Population Health,
University of South Australia
Adelaide, Australia
philip.weinstein@unisa.edu.au

Secretary: Dr. Karin Ljung (Karolinska Institute, Sweden)
Medical Councillor : Prof. Dr. Eduardo Santini-Araujo (Argentina)
Geoscience Councillor: Prof. Dr. Theo Davis (South Africa)

IMGA Committee Chairs:
Bylaws Committee : Prof. Dr. Saverio Fiore (Italy)
Education Committee: Prof. Dr. Claire Howell (UK)
Student Committee: Dr. Ana Maria Rojas (Colombia)
Funding Committee: Prof. Dr. Jiin-Shuh Jean (Taiwan)

NEW IMGA COUNCIL
According to the bylaws IMGA, in autumn 2011, through its nomination committee proposed certain changes in the council, including that councillors serve for two terms, which means that some councillors must be re-placed. After voting by the IMGA members the council from January 1 2012 will be as shown below, with other changes likely during the year:

Chair: Jose Centeno
Co-chair geosciences: Olle Selinus Co-chair medical sciences: Nelly Manay (NEW)

Secretary: K Ljung Björklund
Treasurer: David Slaney
Editor: David Elliott
Web master: Karin Ljung Björklund

Councillors:
Eduardo Santini-Araujo Theo Davies
Chaosheng Zhang (NEW) Hisashi Nirei
Mark Cave (NEW) Maria Armienta (NEW)

IMGA NEWS

NEW BYLAWS
A new Constitution and Bylaws were also adopted after voting by the members.

NEW POLICY BOOK.
The International Medical Geology Association Policy Book contains a record of decisions made by the IMGA Executive Board that has broad, long-lasting effects on the Association. The Policy Book will be continuously updated and should be recognized as a complement to the Constitution and Bylaws. The contents of the policy book are as follows:

Committees of IMGA
Membership and dues
Advisors
Medical Geology Regional Divisions
Awards of IMGA
Short courses
Code of Practice for Symposia
Medical Geology Newsletter Policy

The new bylaws and the Policy Book will be posted on the IMGA website at the beginning of January.

IMGA ON THE WEB

The IMGA website contains information on how to join IMGA, current events, publications and links to other sites of interest and was updated during the year and can be found at:
http://www.medicalgeology.org/index.htm

Other Medical Geology websites:

http://proj.ncku.edu.tw/imgatwn/ (Taiwan Chapter website)
https://sites.google.com/site/grupodegeologiamedicayforense/ (Colombian website in Spanish)
https://www.facebook.com/pages/International-Medical-Geology-Association-IMGA/217954944942790 (Facebook, IMGA)
https://www.facebook.com/pages/International-Medical-Geology-Association-Taiwan-Chapter/141527755859166 (Facebook, Taiwan Chapter)
https://www.facebook.com/group.php?gid=117427695222 (Facebook Medical Geology group)
https://www.facebook.com/group.php?gid=49042249088 (Facebook, Colombian chapter)
http://www.linkedin.com/groups?gid=2857479&trk=myg_ugrp_ovr (Medical Geology group in Linkedin)

CHAPTERS

To expand and develop the IMGA community world-wide, IMGA is encouraging the establishment of Local Chapters (i.e., groups) within individual countries. The aim is that IMGA Local Chapters are established by local groups of enthusiasts interested in Medical Geology. The IMGA bylaws state that:

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 a way to "locally" facilitate the growth of Medical Geology. The concept of developing "Chapters" is a fundamental basis by which larger societies strengthen their regional and eventually their national development. Chapters are designed to operate within the "confinements" of their locality and therefore they are complimentary to the Regional Divisions of IMGA 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 central (see the IMGA web-site for details). All affiliated organisations, including Chapters, must send regular reports for the newsletter.

Each Chapter must consist of at least 5 members in order to be recognised by the IMGA Committee. There are no rules as to how each Local Chapter should be organised. Each Local Chapter can decide the structure that is best for their needs depending on the activities that they plan to organise in their region. However, it is recommended that each Local Chapter appoints a Chairman who heads the Chapter and liases with the IMGA Committee. Chapters may also want to appoint a Secretary to help take the minutes of meetings, etc.

Once a local grouping has 5 members and a structure in place (i.e., has nominated a Chairman, etc.), an application can be made to the IMGA Committee for approval to become a Local Chapter. Once approved, by the IMGA Committee, an annual certificate of recognition is issued to each Chapter.

The IMGA Committee sets aside 25% of the dues from Chapter members for use by the Local Chapter. The Local Chapter can apply to use these funds on IMGA Board approved activities. In addition, Local Chapters can apply to the IMGA Committee for funds to support local activities.

In this newsletter we extend a warm welcome to the Geology and Health Division of the Geological Society of America, which has joined IMGA as an Honorary Chapter (see pages 8 and 14). This joins the Local Chapters that have already been established successfully in the following countries: Bolivia, Brazil, Colombia, Ghana, Iran, Macedonia, Portugal, Taiwan, Argentina, Japan, Italy and Uruguay. Several of these Chapters provide reports of their activities in this newsletter.

If you would like to organise an IMGA Local Chapter or apply for IMGA Committee approval for a Local Chapter, please contact:

Fiona Fordyce, IMGA Local Chapters Councillor *fmf@bgs.ac.uk*
British Geological Survey
West Mains Road
Edinburgh EH9 3LA, UK

IMGA LOCAL CHAPTERS, NOVEMBER 2011

ESTABLISHED CHAPTERS

The date on which the certificate was presented is shown in brackets after the Chapter name.

Brazil (2008)
Contact: Dr. Bernardino Figueiredo, Institute of Geosciences, Univ. of Campinas, PO Box 6152, 13083-970 Campinas, Brazil.
berna@ige.unicamp.br
Joint Leader: Dr. Cassio Silva, Geological Survey of Brazil, Av. Pasteur, 404 22,292,040, Rio De Janeiro, Brazil
cassio@rj.cprm.gov.br

Colombia (2008)
Contacts: Ana Maria Rojas, Medical Geology Research Group, Univ. Nacional de Colombia (National Univ. of Colombia), Apartado Postal 140455 de Chía, 11001 Chía, Colombia
pegmanana@gmail.com
Ricardo Ballesteros, Medical Geology Research Group Univ. Nacional de Colombia (National Univ. of Colombia), Carrera 30 Calle 45, 11001 Bogotá, Colombia
ricardoandres_25@hotmail.com

Ghana (2008)
Contact: (currently inactive): Dr Emmanuel Arhin, Dept. of Earth and Environmental Sciences, Faculty of Applied Sciences, Univ. for Development Studies, Navrongo Campus, P.O. Box 24, Navrongo, UER, Ghana and Univ. of Leicester, Geology Department, University Road, Leicester, LE1 7RH, UK
ea163@leicester.ac.uk; lordarhin@gmail.com
Current Leader: Dr. Richard L.K. Glover, Dept. of Applied Biology, Faculty of Applied Sciences, Univ. for Development Studies, Navrongo Campus, P.O. Box 24, Navrongo, UER, Ghana
richkwame@yahoo.com
+233 2447 53349, +233 2081 74175 and +233 2652 67145
Chapter Secretary: Mr. Emmanuel O. Oyelude, Dept. of Applied Chemistry and Biochemistry, Faculty of Applied Sciences, Univ. for Development Studies, Navrongo Campus, P.O. Box 24, Navrongo, UER, Ghana
emmanola@gmail.com or *Emmanuel.oyelude@uds.edu.gh*
+233 2466 81133, +233 2614 00399 and +233 2762 26873

Republic of Macedonia (2008)
Contact: Dr. Tena Sijakova, Faculty of Mining and Geology, St Cyril and Methodius University, Goce Delcev 89 2000 Štip, Republic of Macedonia
sijakova@yahoo.com; blazo.boev@ugd.edu.mk

Iran (2008)
Contact: Dr Abdolmajid Yaghubpur, Prof Economic Geology, Dept. of Geology, Tarbiat Moalem Univ., Tehran 15614, Iran.
Tel/Fax: 0098-21-22400112
ayaghubpur@yahoo.com

Bolivia (2009)
Contact: Rafael Morant National Institute of Occupational Medicine, La Paz, Bolivia
rcervantesmorant@yahoo.com

Portugal (2010)
Contact: Dr .Eduardo Ferreira da Silva, Geosciences Dept., University of Aveiro, Aveiro, Portugal
eafsilva@ua.pt

Taiwan (2010)
Contacts: President: Prof Jiin-Shuh Jean, Professor of Hydrogeology, Dept. of Earth Sciences, National Cheng Kung University, Tainan City 70101, Taiwan
jiinshuh@mail.ncku.edu.tw
Secretary-General: Professor Ying-Jan Wang, Toxicologist, Dept. of Environmental Medicine, National Cheng Kung University, Tainan City 70101, Taiwan
yjwang@mail.ncku.edu.tw.
Chairman Conference and Lecture Committee: Prof. Kou-Chin Hsu, Dept. of Resources Engineering, National Cheng Kung University, Tainan City 70101, Taiwan
kchsu@mail.ncku.edu.tw

Italy (2010)
Contact: Prof Saverio Fiore, Institute of Methodologies for Environmental Analysis- CNR, 85050 Tito Scalo (PZ), Italy
Adjunct Professor of Mineralogy, University of Basilicata
saverio.fiore@cnr.it

Argentina (2010)
Contacts: Prof Eduardo Santini (Vice-President South-America International Academy of Pathology)
santiniaraujo@laborpat.com.ar

Uruguay (2010)
Contact: Prof Nelly Manay, Dept of Toxicology and Environmental Hygiene, University of the Republic, Montevideo, Uruguay
nmanay@fq.edu.uy and *nellymanay@gmail.com*

ESTABLISHED CHAPTERS (CONT.)

Japan (2010)
Contact: Prof Hisashi Nirei, The Geo-pollution Control Agency International Union of Geological Science (IUGS) Geoscience for Environmental Management (GEM) Japan Branch, 1277-1 Kamayauchi,Motoyahagi, Katori City, Chiba Prefecture 287-0025, *Japan*
nireihisashi@msn.com

Russia/NIS chapter (2006)
Contact:Iosif Volfson. Chair of Medical Geology Division of Russian Geological Society .
geolog1955@mail.ru

Sweden (2011)
Contact: Dr Olle Selinus, IMGA Co-Chair for GeoScience.
olle.selinus@gmail.com

HONORARY CHAPTERS

Geology and Health Division, Geological Society of America
Contact: Dr Syed Hasan, Chair, Geology & Health Division, Geological Society of America (2010)
HasanS@umkc.edu

CHAPTERS WAITING APPROVAL

None pending

POSSIBLE CHAPTERS

UK
Contact: Dr Mark Cave, BGS
mrca@bgs.ac.uk

Nigeria
Contact: Holleng Bwakat, Plateau Rural Water Supply and Sanitation Agency, Jos Plateau State, Nigeria.
bwaks2000@gmail.com

India
Contact: Dr Pradip Wesanekar, Dept of Geology, Science College, Nanded, India
prwesanekar@yahoo.com

Bulgaria
Contact: Prof Krasimira Staneva, Bulgarian Association of Geomedicine and Geotherapy (BAGG), Sofia University St Kl. Oxridski, FNPP,
69A bld, Shipchenski prohod, Sofia, Bulgaria
staneva_krasimira@yahoo.com; bagg.bg@gmail.com
tel. +359 899 000676
tel. +359 2 9706 260

China
Contact: Prof Zheng Baoshan, Institute of Geochemistry, Chinese Academy of Sciences, China
zhengbs@public.gz.cn

Cyprus
Contact: Constantia Achilleos, Cyprus University of Technology, Limassol, Cyprus
geologydia@yahoo.com

Kenya
Contact: Prof Beneah Odhiambo, Moi University, P. O. Box 3900, Eldoret – 30100, Kenya
odhiambobdo@gmail.com

Denmark
Contact: Dr Peter Appel, Geological Survey of Denmark
pa@geus.dk

USA
Contact: Brittany Merola, Nicholas School of the Environment, Duke University, North Carolina, USA
rbm11@duke.edu

HONORARY CHAPTERS: THE IMGA WELCOMES THE FIRST HONORARY CHAPTER

The IMGA has created a new category – **Honorary Chapter** - to accommodate the Geological Society of America's Geology and Health Division. The Division was established in 2006 with objectives and goals similar to that of the IMGA. Like the IMGA, the Division is concerned with the intersection of geology with the health of humans, animals and plants. And like the IMGA, the Division strives to: bring together an interdisciplinary range of scientists and practitioners; facilitate the presentation and discussion of relevant problems and ideas; promote research and publication of relevant studies; foster recognition of significant contributions and achievements; and encourage and mentor interested students in these interdisciplinary related issues. The Division is now a vibrant and growing organization with some 250 members, primarily from North America. The management of both organizations felt that affiliation of the like-minded organizations would be mutually beneficial.

As an Honorary Chapter the Division will remain fully independent but agreed to abide by the IMGA rules governing Chapters. The Division will maintain at least five members who are also members in good standing of the IMGA. The Division will advertise and promote all IMGA events and activities and will encourage its membership to join the IMGA. The Division will provide a contribution describing Division activities to all future IMGA Newsletters.

In return, the IMGA will recognize the Division as an Honorary Chapter and offer Division members a discount in IMGA membership dues and discounts to attend IMGA activities and events and for IMGA products. The IMGA will advertise and promote all Division events and activities. The IMGA will provide a summary of its activities for the Division Newsletter.

The new Honorary Chapter has already demonstrated its enthusiasm for this relationship by submitting a proposal to host the 2013 IMGA conference.

CHAPTER REPORTS (in alphabetical order)

ARGENTINA

Report from Chapter Leader Dr. Eduardo Santini-Araujo.

The Argentina Chapter is very active and has 6 members: three dentists one specialized in biomaterials for medical and dental use and three medical doctors, one specialized in infectious diseases and two pathologists. Dr. Daniel Olmedo participated as a speaker in the Symposium of Environmental Pathology at The XXVIII International Congress of the International Academy of Pathology, Sao Paulo 2010 with Dr. José Centeno and Dr. Florabel Mullick. Dr. Eduardo Santini-Araujo together with Dr. Mullick were co-chairs of the Symposium. Dr. Diego Fridman, a member of the IMGA Argentine Chapter, presented a paper at Bari in the GEOMED 2011 4th International Conference on Medical Geology: Miguel Borruel, Diego Fridman, Gaston Borruel, Daniel Stamboulian, Evaluation of Health Impact in an open-pit mining area in Catamarca, Argentina. The Argentine IMGA Chapter organized its Annual Meeting in July 2011. This was held in the Central Army Hospital, with 26 people registered. The meeting had as its central topic the pathology produced by the biological use of materials.

BRAZIL

Report from Chapter Leader Dr. Bernardino Figueiredo.

The Brazil Chapter is very active and has 10 members, mainly environmental scientists. The Chapter is led by Dr. Bernardino Figueiredo (University of Campinas) and Dr. Cassio Silva (Geological Survey of Brazil). The Chapter is based on the former UNICAMP Chapter and it has recently organised one short course and several lectures at scientific meetings and universities.

COLOMBIA

Report from former Chapter Leader Sandra Londono.

The Colombian Chapter is very active. Sandra Londono is no longer the leader of the Chapter, as she is no longer based in Colombia while studying for a PhD in the USA. Members of the Chapter are mainly geology students with two chemical pharmacists. The Chapter has established its own excellent web-site: *https://sites.google.com/site/grupodegeologiamedicayforense/* and continues to work on a variety of research topics including: clay minerals used in traditional medicine; geological controls on parasitic diseases, and health effects of Hg pollution from gold mining. Ana Maria Rojas and Ricardo Ballesteros are the new leaders of this Chapter. IMGA would like to thank Sandra for all her outstanding work for the Colombia Chapter including her excellent IMGA Newsletter reports over the years and wishes Sandra well with her PhD studies. IMGA would like to welcome Ana Maria Rojas and Ricardo Ballesteros as the new leaders of this Chapter and looks forward to working with them in the future.

GHANA

Report from Chapter Leaders Dr. Emmanuel Arhin and Dr. Richard LK Glover.

Dr. Arhin is currently studying as a Post Doc in the UK. Therefore, although he is still the Leader of this Chapter he is currently not the active head. This responsibility has passed to the Dr. Richard Glover and the Chapter Secretary Mr. Emmanuel Oyelude. The chapter has 15 members, mainly environmental scientists (Earth Scientists/Geologists, Chemists/Biochemists, Biologists/Microbiologists). The Chapter conducted a pilot study on the quality of underground water of some communities in the catchment area of the university campus. Levels of arsenic greater than the maximum permissible limit for drinking water were observed, especially during the dry season.

IRAN

Report from Chapter Leader Dr. Abdolmajid Yaghubpur.

The Iranian Chapter is very active and has 16 members. These are a mixture of environmental geoscientists and medical professionals. The Chapter organised the very successful First International Medical Geology Symposium of Iran at the Geological Survey of Iran in June 2010, with a message from Professor Olle Selinus. It included several medical geology sessions in different geology and mineralogy seminars. A conference report is available in the IMGA Newsletter 18. The Medical Geology Centre of the Geological Survey of Iran has also sent a preliminary proposal for preparing an Atlas of the World Medical Geology to UNESO. The Atlas of Medical Geology of Iran has already been published by the Medical Geology Centre of the Geological Survey of Iran and a copy of it was presented to Professor Olle Selinus.

ITALY

Report from Chapter Leader Prof. Saverio Fiore.

The Italian Chapter is very active and has 10 members, all environmental scientists. The Chapter did an outstanding job of organising the 4th International Conference on Medical Geology GEOMED2011 in Bari, Italy, September 2011. The members of this Chapter are also involved in the following Medical Geology projects: risk evaluation of naturally occurring asbestos (NOA); airborne particles; natural vs. anthropogenic provenance; mineral dissolution by lung fluids; experimental investigation on smectite and tremolite; kidney stones; influence of geological/environmental factors.

JAPAN

Report from Chapter Leader Prof. Hisashi Nirei.

The Japan Chapter is very active and has 12 members, a mixture of environmental geoscientists and chemists. The Chapter organises the very successful Annual Symposium for Geo-pollution Science, Medical Geology and Urban Geology and publishes the Journal on Geo-pollution Science, Medical Geology and Urban Geology. The Chapter has also held approximately 15 informal meetings for study of the book "Essentials of the Medical Geology". Prof. Hisashi and his colleagues are also very involved in radioactivity assessments following the Tohoku earthquake in March this year. The IMGA Committee sends its sympathy and support to the Japan IMGA Chapter following the terrible earthquake and continuing environmental problems in Japan this year and very much appreciates the work that the IMGA Local Chapter is doing in very difficult circumstances.

PORTUGAL

Report from Chapter Leader Dr. Eduardo Ferreira da Silva.

The Portugal Chapter is very active, with 28 members, a mixture of environmental and medical scientists. The members have the following interests: organic petrology and geochemistry; environmental geochemistry; hydrogeology; thermal and mineral waters; groundwater contamination; isotope hydrology; mineralogy/ geomaterials; peloids/maturation process; environmental pollution; uranium; radon and natural radioactivity; health risk assessment; contamination in mining areas and its repercussions in public health; geostatistics and multivariate data analysis.

The members are participating in several research projects in the area of Medical Geology. In addition, Medical Geology was introduced as a topic in several Masters and PhD programmes at the universities.

The members of the chapter are involved in the organization of several conferences where the issue of Medical Geology is one of the main topics (see Events pages 21 and 45).

REGIONAL DIVISION/CHAPTER OF RUSSIA AND NIS

Report from Iosif Volfson.

First of all, on behalf of all members of IMGA RD NIS, let me thank the IMGA for the Recognition award for an IMGA Chapter for Exemplary Services in Medical Geology, the highest appreciation the medical geologists of the Commonwealth of Independent States (NIS) has ever had. We are also happy and proud for the great success in Bari.

In 2011 medical geologists from NIS participated in scientific conferences which brought together more than 300 scientists and practitioners in environmental safety from Armenia, Belarus, Bulgaria, Germany, Poland, Russia, Ukraine, and Uzbekistan (see Events section of this Newsletter for details of these conferences).

It is worth saying that the medical geology community of NIS, scientists of Russia and Armenia and other NIS countries has entered into a new phase. This change is very attractive for the World Medical Geology Community as NIS scientists are becoming more open to IMGA initiatives.

The Center for Ecological Noosphere Studies of the National Academy of Sciences of the Republic of Armenia was founded in 1989, specializing in environmental studies and geochemistry. The director is an IMGA member Dr. Armen K. Saghatelyan. At present, the Ecocenter conducts 9 budgetary-supported scientific programs and numbers 77 employees, 50 of them being researchers (7 doctors of sciences and 14 candidates of sciences).

The structure of the Ecocenter comprises a number of problem-oriented laboratories and research teams conducting investigations in: environmental geochemistry; biogeochemical cycles; biomonitoring; radioecology; bioenergetics; assessment and mapping of landscapes and natural resources; geopathogenic zones; computer technologies, and databases in the field of environmental protection. The Ecocenter carries out interdisciplinary investigations in the field of human ecology. In particular, joint programs in co-operation with the National Institute of Health, the Armenian Institute of General Hygiene and Occupational Diseases have been developed. The Ecocenter`s laboratories provide atomic-absorption, spectral, emission, spectrophotometric, radiation, mass-spectrometric and chemical methods of analysis.

The researchers take an active part in international scientific conferences; lately they have submitted a number of reports to different forums. Currently, a joint research program, Environmental heavy metals, in co-operation with the Toxicological laboratory of West-Allis Hospital (USA) is being implemented. Since 2002, within the framework of cooperative scientific activities in the area of bioenergetics, the Ecocenter has collaborated with the UK ADAS Nutritional Sciences Research Unit. In co-operation with the American Society of Armenian Scientists and Engineers, a project, Energetic forests of Armenia, has been developed. In cooperation with the Danish Technological Institute, studies on lead contents in gasoline have been conducted. Within the framework of the NATO Science for Peace program, a grant was won for performing a regional project, Cooperative river monitoring between Armenia, Azerbaijan, Georgia and the USA. In cooperation with WS Atkins Environment Firm (UK), Ecocenter participates in the Armenian Nuclear Regulatory Authority's project, Mapping and GIS of radioactive pollution in case of emergency on NPP site. In 2002, a grant was awarded by CRDF for the project, Paleoecology and paleoradioecology in Lake Sevan (Armenia). The Ecocenter's researchers take an active role in EuroMAB programs. They participated as experts in European Union INTAS program execution as well as in a number of UN programs. The Ecocenter is recognized worldwide. In particular, the information about it is included in theDirectory of Ecology and Conservation in Russia (Edinburgh 1998), World of Learning, (London 1999), European Directory of Environment and Health Organisation (UNED-UK 1999) and The Environment Encyclopedia and Directory 2001 (London). Since 1999,

the Ecocenter has been a Collective Member of the Russian Ecological Academy. In 2002 the JSPS Postdoctoral Fellowship Foundation awarded a grant to the Ecocenter for the topic, Using insects of the Ararat Valley in bioindication. In July 2002, Ecocenter held an International workshop. Ecotoxicological risk assessment of environmental pollution in the Caucasus, due to a NFSAT grant within the framework of International Risk Assessment Network

TAIWAN

Report from Chapter Leader Professor Jiin-Shuh Jean

The Taiwan Chapter is very active and has 30 members and one group member. The majority of these are environmental scientists and a few medical professionals. The Chapter has organised several meetings to date including preparing for the establishment of IMGA-Taiwan, June 21, 2011 and June 28, 2011.

The inaugural ceremony of the Taiwan Chapter, IMGA was held on 12 July 2011 in the International convention center of National Cheng Kung University, Tainan, Taiwan. There were about fifty Taiwan members and nonmembers in the general assembly. During the opening ceremony, the chairman Jiin-Shuh Jean (Fig. 1) invited the vice president Hung Sheng Yen (Fig. 2), Dean Andy Fuh of theCollege of Science (Fig. 3) and Dean Chi-Her Lin of the College of Medicine (Fig. 4), National Cheng Kung university (NCKU) to offer welcome addresses.

Fig. 1 Prof. Jiin-Shuh Jean's opening speech

Fig. 2 Vice president Hung-Sheng Yen's welcome address

Fig. 3 Dean Andy Fuh's welcome address

Fig. 4 Dean Chi-Her Lin's welcome address

Fig. 5 Prof. Kim Dowling's first lecture during the general assembly

Fig. 6 Prof. Kim Dowling's 2nd lecture at Department of Earth Sciences, NCKU

We also invited our distinguished guest Professor Kim Dowling (Fig. 5, 6) (Ballarat university, Australia) to provide a welcome address. After that, she gave an hour's lecture on "Medical Geology: A multi-disciplinary response to the issues of a complex world". Her lecture drew the attention of the audience to an understanding of medical geology. During the coffee break, we had group photos (Fig. 7, 8, 9).


Fig. 7, 8 and 9 Group photos during the general assembly

After the break, we had a business meeting (Fig. 10, 11), in which we elected 9 director councilors and 3 supervisor councillors listed below:

Direct councillors:

1. Prof. Jiin-Shuh Jean (Department of Earth Sciences, NCKU, Tainan, Taiwan)
2. Prof. Ming-Chee Wu (Department of Earth Sciences, NCKU, Tainan, Taiwan)
3. Prof. Bu-Miin Huang (Institute of cellular Biology and Medicine, NCKU, Tainan, Taiwan)
4. Prof. How-Ran Guo (Department of Environmental and Occupation Health, College of Medicine, NCKU, Tainan, Taiwan)
5. Prof. H. Paul Wang (Sustainable Environment Research Center, NCKU, Tainan, Taiwan)
6. Prof. Chien-Yen Chen (Department of Earth and Environmental Sciences, National Chung Cheng University, Minhsiung, Taiwan)
7. Prof. Cheh-Shyh Ting (Department of Civil Engineering , National Pingtung university of science and technology, Pingtung, Taiwan)
8. Prof. Chia-Hung Jen (Assistant Research Fellow, Environment and Safety Division, National Kaohsiung Normal university, Kaohsiung, Taiwan)
9. Prof. Chi-Ling Chen (Collage of Medicine Graduate institute of clinical Medicine, National Taiwan University, Taipei, Taiwan)

Supervisor councillors:

1. Prof. Jiun-Chuan Lin (Department of Geography, National Taiwan university, Taipei, Taiwan)
2. Prof. Chen-Wuing Liu (Engineering for sustainable Environment, National Taiwan university, Taipei, Taiwan)
3. Prof. Jiann-Ming Wang (Department of Safety, Health and Environmental Engineering, Hung Kuang University, Taichung, Taiwan)

Fig. 10 Business meeting

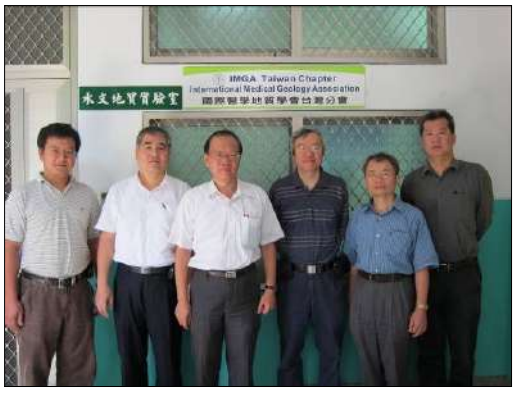


Fig. 11 Director and Supervisor Council's meeting

Professor Jiin-Shuh Jean (Department of Earth Sciences, NCKU) was elected as the first term (three years) director general of the Taiwan IMGA chapter. Director General Jiin-Shuh Jean appointed Prof. Ying-Jan Wang (Institute of environmental Medicine, NCKU) as a secretary general and Professor Kuo-Chin Hsu (Department of Resources Engineering, NCKU) as a chairman of the Lecture and Conference committee. We will hold an annual meeting and conference once a year in May to bring together our Taiwan members to discuss medical geology problem in Taiwan.

URUGUAY

Report from Chapter Leader Dr Nelly Manay.

The Uruguay Chapter is very active and has 16 members. These are a mixture of chemists, geologists, physicians, veterinarians and engineers. The Chapter members organised the very successful 3rd Hemispheric Conference on Medical Geology in October 2009 and the Chapter arose out of this meeting. Conference reports are available in the 2009 IMGA Newsletters 15 and 14. Since then the Chapter has had a first meeting and continues contact by e-mail. Most active scientists are researchers from the University of the Republic working together in subjects of common interest such as environmental Pb and As. A Medical Geology short course was planned with Dr. Centeno but it had to be cancelled for several reasons. It is proposed for next year.

IMGA HONORARY CHAPTER, GSA GEOLOGY AND HEALTH DIVISION

Report from Dr Bob Finkelman on behalf of Chapter Leader Dr. Syed Hasan.

The Geological Society of America's (GSA) Geology and Health Division is proud to be accepted as the first Honorary Chapter of the IMGA. It is clear that our goals are fully consistent with and complimentary to those of the IMGA and we look forward to productive interactions as an active participant and as a supportive associate of the Association.

Division Mission:

Purpose. The Geology and Health Division is concerned with the intersection of geological conditions, whether natural or anthropogenic in origin, with health, disease, pathology and death in modern and fossil humans, animals and plants. The interests of the Geology and Health Division focus on geology and its interdisciplinary relationship to medicine, biology, chemistry, and other sciences.

The Geology and Health Division

a) brings together an interdisciplinary range of scientists and practitioners interested in these issues;
b) facilitates the presentation and discussion of relevant problems and ideas;
c) promotes research and publication of relevant studies;
d) cooperates with other divisions and the sections of the Society and with other scientific organizations in fostering, aiding, furthering, and promoting research in relevant areas;
e) fosters recognition of significant contributions and achievements;
f) encourages and mentors interested students in these interdisciplinary related issues; and
g) advises and assists the officers and committees of the Society in matters pertaining to the interests of the members of the Geology and Health Division.

Website:

http://rock.geosociety.org/GeoHealth/index.html

Newsletter and Publications
An annual newsletter and periodic blast e-mails are sent to members via GSA Wesley Hill. (contact Wesley "WHill@Geosociety.org" for copies if required)

Officers and Management Board (2010-2011)
Chair: Syed E. Hasan
First Vice-Chair: Robert B. Finkelman
Second Vice-Chair: Saugata Datta
Secretary-Treasurer: Kevin E. Nick
Immediate Past Chair: H. Catherine W. Skinner

Currently we have 225 members, down about 10% from last year. About 90% of our membership is from the U.S. and Canada. We recently started a Geology and Health Division Endowment Fund.

Much of our effort is focused on developing and stimulating sessions at regional and national scientific meetings devoted to medical geology issues. At the GSA meeting in Minneapolis, MN the Division proposed and/or co-sponsored eleven sessions (see Past Events, page 32).

The Geology and Health Division (IMGA Honorary Chapter) is honoured and excited to be chosen as the host for the 5th IMGA International Conference in 2013 (GEOMED 2013). Our preliminary plans call for the conference to be held in northern Virginia near the U.S. Geological Survey (USGS) headquarters probably in early to mid-September 2013. The USGS will be an active partner in this venture as will be the GSA and the American Geologic Institute. We anticipate collaboration from a number of other organizations such as the Environmental Protection Agency, the National Institutes of Health, the Centres for Disease Control, the American Public Health Association, the National Science Foundation, and others.

We fully expect that this conference will be informative, exciting, and achieve the highest level of visibility ever experienced by the discipline of Medical Geology. We look forward to seeing all of you at the conference.

See Upcoming Events page 47 Section for details of GEOMED 2013

INTERNATIONAL MEDICAL GEOLOGY INSTITUTE (IMGI)

A. Umran Dogan[1], Tuncay Delibasi[2], Meral Dogan[3]
[1]University of Iowa, Chemical and Biochemical Engineering and Center for Global and Regional Environmental Research (CGRER), Iowa City, Iowa, USA. [2]Ankara Diskapi Training and Research Hospital, Department of Endocrinology and Metabolism, Ankara, Turkey. [3]Hacettepe University, Department of Geological Engineering, Ankara, Turkey
December, 2011

INTRODUCTION

The major goal of this project is to establish an International Medical Geology Institute (IMGI).

The IMGI will be located in Ankara, Turkey where facilities are adequate for the initial activities of the research, and the expertise of critical faculty members is available to conduct such studies. IMGI will also promote and guide the International program of Medical Geology research. The IMGI, with the six research centers and the repository, will facilitate research on medical geology/environmental problems and associated diseases in people. Data produced from these studies will be made available to the international research community and to environmental policy makers.

OBJECTIVES

- To conduct research in human populations defining the health effects of environmental exposures to minerals and toxic substances.
- To facilitate and assure the future of research activities concerning the objective, create a safe repository for human tissues, cells, and mineralogical samples so that molecular and cellular analysis and quantitative mineralogical studies can be performed using tissues, cells, and soil/rock samples.
- To identify early biochemical and molecular biology changes in “exposed” people in attempts to identify high versus low risk individuals and groups.
- To provide an academic environment that will encourage and promote research in medical geology, which is vital in developing countries.
- To build and expand on existing and future scientific strengths within the universities and industries.
- To assure that the research conducted will promote proper international exchange and to disseminate the scientific information within the community concerning the potential environmental health effects.

ORGANIZATIONAL STRUCTURE

International Scientific Board

An International Scientific Board will be composed of prominent, internationally recognized, scientists and medical doctors, who have active interests in this field. Their terms will be for two years and the total numbers will be defined by an advisory panel. The scientists and medical doctors on this board will give advice and assist in the development and implementation of the IMGI's overall objectives and guide the directorate in the international scientific affairs. The board members will also act as contact sources for collaborative research between their countries/universities and the IMGI via the coordinator.

International Board Members (2012-2014)
Dr. Jose Centeno, USA
Dr. Olle Selinus, Sweden
Dr. Robert Finkelman, USA
Prof. Philip Weinstein, Australia
Prof. Michele Carbone, USA
Prof. Paolo Ballirano, Italy
Prof. Mickey Gunter, USA
Prof. Tonci Balic-Zunic, Denmark
Prof. Gregory Carmichael, USA

IMGI Coordinator
The Center will integrate laboratory, computational, library, and human resources. The IMGI Coordinator, Prof. A. Umran Dogan, will be a liaison between International Medical Geology Association (IMGA) and IMGI. The IMGI coordinator will be responsible for coordination of international issues related to Medical Geology. The IMGI Coordinator will also be a member of the IMGI's research team.

IMGI Directors
The IMGI will provide the locus and the resources for bringing together skills and knowledge from a variety of disciplines to conduct research into complex environmental problems.

There are two directors, one for Medical Science, Assoc. Prof. Tuncay Delibasi and the other Geological Science, Asst. Prof. Meral Dogan. The directors will be:
(i) responsible for both administration and the organizations of academicians working for the IMGI.
(ii) expected to build a strong international scientific recognition for the IMGI.
(iii) responsible for seeking additional funds for both operational and research purposes
(iv) expected to facilitate their own scholarly research.

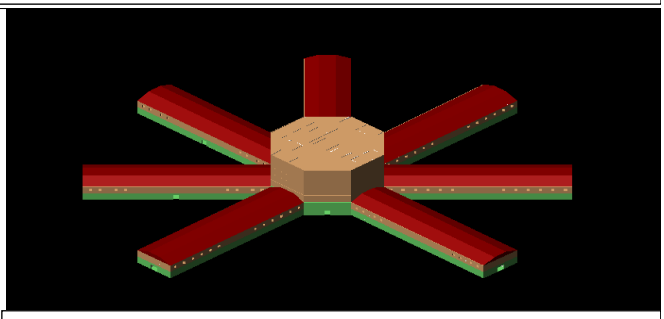
IMGI Proposed Centers
The IMGI initially will have six research centers and a repository:
Environmental Mineralogy and Geochemistry
Molecular Biology and Toxicology
Air Pollution and Its Remediation
Soil Pollution and Its Remediation
Water Pollution and Its Remediation
Risk Assessment and Epidemiology
Repository

Center's Responsibilities
It is expected that the leaders of each of these centers will conduct assigned and self-initiated research, collaborate with the international community and publish their findings in scholarly journals.
Each center will be under the direction of the IMGI Directors.

Research, Education, and Publication
The IMGI will provide a place where a rich educational experience will be obtained, especially at the graduate and post doctoral level.

The directorate has explicit responsibility for assuring that the facilities are used fully.

The IMGI will make sure that all publications are made available to the international research community and the editorial board coordinated by Prof. Dogan will include many prominent scientists.



Conceptual Model of IMGI. The actual design may vary. Copyright@Dogan&Dogan, 2006

CENTER FOR RESEARCH IN EMERGING AND ADVANCED TECHNOLOGIES AND ENVIRONMENTAL SCIENCE (CREATES)

Carlos M. Padin and Beatriz Zayas, Universidad Metropolitana, San Juan, PR.

Universidad Metropolitana is establishing a ***C*enter for *R*esearch in *E*merging and *A*dvanced *T*echnologies and *E*nvironmental *S*cience** (***CREATES***), an interdisciplinary research center at the INTENOR Science Park in Barceloneta, Puerto Rico. INTENOR is a non-profit coalition for regional economic development in northern Puerto Rico that brings together academia, government and industry.

CREATES is an innovative project geared to provide a research facility for principal investigators who are actively conducting research, have secured sponsored funding for their research, and are exploring collaborative research projects to expand their possibilities for the creation of new knowledge. It has a unique location within a Science Park surrounded by pharma and biotech industries. The additional support offered by a coalition comprised of key stakeholders in academics, government and industry will create a synergistic initiative for research that crosses the traditional boundaries and foments a comprehensive network for investigation.

The scientific and technical merit of the proposed use of the facility lies in the research to be conducted, which includes research lines in the areas of biomonitoring, bioremediation, biomarkers, geospatial analysis and risk mapping, as well as the emerging fields of metallomics and **medical geology**. This center will have the first dedicated metallomics and medical geology research laboratory in Puerto Rico, making it only one of three worldwide. It will also have the first medical geology laboratory on the island. The integration of multidisciplinary research at this science building meets the required framework of the ecosystem approach, validated by the United Nations.

Following an Ecosystem Approach, the researchers at the Center will be conducting investigations that will enable the entire team to engage in broad analysis of ecosystem issues. True to the ecosystem approach, it will have a broad impact. Research results and data will be integrated into the GIS databases. This wealth of data will form the raw material for the risk analysis. Research results and their analysis will be disseminated through presentations and international networking activities, including opportunities for national/international students and researchers to spend time conducting research activities at the Center.

Summary of a poster presentation, GEOMED 2011, Bari, Italy 20-25 September, 2011.

NOTICES

ADVANCED TRAINING DIPLOMA IN MEDICAL GEOLOGY,
Instituto Superior Tecnico (IST) in Lisboa, Portugal,

IST has recently established an Advanced Training Diploma in Medical Geology. To launch the program, IST held a successful five-day course and workshop on Medical Geology during the week of July 5-9, 2010, under the leadership of Prof. Dr. Luis Filipe Tavares Ribeiro (*luís.ribeiro@ist.utl.pt*) , a member of the Portuguese Chapter on Medical Geology. This specialized course was supported by IST and the International Medical Geology Association (IMGA) and brought together health and geosciences professionals working in the field of Medical Geology. IMGA was represented by its Chairman, Jose A. Centeno. Jose presented two lectures on medical geology research topics, and presented the IMGA Chapter Certificate officially establishing the Portuguese Chapter on Medical Geology. The IMGA Chapter Certificate was presented to Prof. Dr. Eduardo Ferreira da Silva (*eafsilva@ua.pt*)**,** Chairman, Portuguese Chapter on Medical Geology. For more information on the Advanced Training Diploma in Medical Geology, please contact Prof. Dr. Luis Ribeiro at the following address:

Prof. Dr. Luís Ribeiro
Professor Associado c/ agregação (Associate Professor)
CVRM – Centro de Geossistemas (Geosystems Centre)
Departamento de Minas e Georrecursos (Mining and Georesources Department)
Instituto Superior Técnico
Av. Rovisco Pais
1049-001 Lisboa, Portugal
luís.ribeiro@ist.utl.pt

OBITUARY
Paul Meumann Thomas White (3 August 1936 – 9 November 2011)

There are no words to describe how much I admired and adored my Oupa. He was my role model and if I ever come close to being as great as he was, I shall consider myself accomplished. I am truly honored, blessed and proud to have known and been loved by such an indescribably incredible man. A great void has been left in the souls of all those who knew him since his departure into the next (and hopefully better) realm. Rest in peace, Oupa.

From his loving G-Son.

STUDIES IN MEDICAL GEOLOGY

We would like to invite students involved in medical geology activities to submit short articles, including accounts on their on-going work, news of graduation and other items of interest. Please send them to the editor, David Elliott. The first such account appears below, and we hope to see many more items of this nature.

Congratulations to Cassio Roberto da Silva on completion of his doctorate.

Cassio Roberto da Silva

THESIS: GEOLOGICAL RISK ASSESSMENT OF EXPOSURE TO CHEMICAL ELEMENTS FOR ENVIRONMENTAL HEALTH IN THE ARAÇUAÍ-ITINGA, MINAS GERAIS, BRAZIL

Orientadores: Edson Farias Mello, Cícera Neysi de Almeira

Abstract: Thesis submitted to the Graduate Program in Geology, Institute of Geosciences, Federal University of Rio de Janeiro (UFRJ), as part of the requirements for obtaining the title of Doctor of Science (Geology)

This research was conducted in a mineral district, where there are several lithiniferos pegmatites. The geological and geochemical studies of the area and toxicological results in three risk groups, as follows. Metasediments of Macaúbas Group and Salinas Formation occur in the area, as well as aluminous granites (Teixeirinha and Quati) mainly formed by quartz, feldspars, muscovite, biotite, sillimanite, andalusite, cordierite and tourmaline. The 51 drainage and untreated water supply samples, from approximately 80% of the area, were analyzed, and results showed Al values from 0.200 to 0.928 ppm, exceeding the Health Ministry recommended levels. The average levels of 3.1% Al in soils and 1059 mg/kg Al in food were also elevated. Igrejinha and Fazenda Velha communities (Araçuaí Municipality), where 133 people were subjected to plasma analyses, revealed 68% with Al values above 03 µg /L, up to this value is considered normal by the ATSDR (2008), 49% of the people have > 10 µg/L, 10% of the population > 60 µg/L, 5% > 100 µg/L and 2% > 200 µg/L. In a group of 16 people receiving dialysis, 94% of this population is above 03 µg/L of Al, 75% > 10 µg/L, 44% > 60 µg/L, 25% > 100 µg/L and 19% >200 µg/L. The results show that the Al absorbed by the Igrejinha and Fazenda Velha populations is of natural origin, with the exposure route: rock-soil-water-food. It is estimated that in the study area 3200 people are exposed to Al.

Keywords: Geological risks to environmental health; geochemical and health; aluminum toxicity in plasma.

EUROGEOSURVEYS AGRICULTURAL SOIL GEOCHEMICAL MAPPING PROJECT

The EuroGeoSurveys Geochemistry Working Group is carrying out 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 is 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 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.

Reimann, C., Siewers, U., Tarvainen, T., Bityukova, L., Eriksson, J., Gilucis, A., Gregorauskiene, V., Lukashev, V.K., Matinian, N.N., & Pasieczna, A. 2003. Agricultural Soils in Northern Europe: A Geochemical Atlas. Geologisches Jahrbuch, Sonderhefte, Reihe D, Heft SD 5, Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, ISBN: 3-510-95906-X.

ECOLOGY PROBLEMS IN MINERAL RAW-MATERIAL MINING

Varna, Bulgaria, August, 28 September, 2 2011

The conference was held at the International House of Scientists "Fr. J. Curie" – Resort "St. St. Constantine and Elena", Scientific and Technical Union on Mining, Geology and Metallurgy of Bulgaria (Chair Dr. Tsolo Vutov, Vice-Chair Academician Dimcho Josifov) as well as the International Academy of Ecology and Safety of Human Beings (President Dr. Oleg Rusak of Russia) were the principals of this prestigious scientific forum.

The target of the conference was to highlight the key developments and trends, stimulate interaction, to interchange views and knowledge between business and science and to expose participants to initiatives, practice and technology that are potential keys to our future and sustainable development. The conference brought together scientists and specialists from Belarus, Bulgaria, Russia, Ukraine, and Uzbekistan and became an arena for extended discussions and exchange of good ideas and new partnerships between scientists and specialists and the identification of the strategic and fundamental problem – the protection of the environment!

The participants made the International Scientific Technical Conference "Environmental Problems of Mineral Raw-Material Mining" a highly productive and exciting event. The topics of the conference were not only ecological problems in mineral raw-materials mining but other aspects of environmental safety:

1. Specific pollution of the environment from geological exploration, mining and metallurgical production and strategy for its restriction.
2. Waste products from mining and metallurgical enterprises and opportunities for its utilization.
3. Recultivation of polluted terrains and purifying of the waste water (methods and technologies).
4. European directives, national requirements, monitoring and protection of the environment in the areas of mining and metallurgical enterprises.
5. Health effects on the staff working at mining and metallurgical enterprises and population, preventive measures and medical monitoring.
6. The problems of environmental safety in other spheres of human activities.
7. Education and qualification of experts in ecology.

ROSGEO members presented at the conference: the ROSGEO contribution in securing the medical and environmental safety of mining areas of Russia and NIS (devoted to the 5th anniversary of the establishment of IMGA RD Russia-NIS, authors: Iosif F. Volfson, Evgeny G. Farrahov) and Object monitoring of uranium mining of ocular pathology (authors: Elena V. Kremkova, Igor G. Pechenkin, and Iosif F. Volfson).

The Russian Geological Society (ROSGEO) is one of the biggest professional societies in Russia. The ROSGEO Medical Geology Division (MGD) was created on March 2005 and incorporated in IMGA since 2005. Social security of geologists as well as their families is a principal target of ROSGEO. The environmental problems of geological surveys, prospecting and mining could have been partly solved by modern trends in environmental research called objective monitoring, in the presentation the collective of the ROSGEO authors, "Object monitoring of uranium mining of ocular pathology". Geological factors pose a risk of developing certain eye defects, and the origins of these risks can be divided into three main categories. As exploration and mining of uranium deposits continues, understanding these risks is of utmost importance in order to maintain the health of the population. Radiation exposure affects all parts of the eye. Objective monitoring of the geological environment is the most purposeful and appropriate way to conduct the environmental research. Measures of environmental protection, during the course of the exploration and mining of uranium should be carried out at all stages of exploration, development, mining, and rehabilitation of the uranium-mining terrains. Specific methods in this area will help improve the health and quality of life of the people at risk.

THE IV INTERNATIONAL SCIENTIFIC SYMPOSIUM ON BIO-INERT INTERACTIONS IN NATURAL AND TECHNOLOGICAL SYSTEMS

September, 19-21, 2011, Saint-Petersburg State University (SPbGU), Saint-Petersburg, Russia.

The Saint-Petersburg Society of Naturalists (the oldest scientific society of Russia, established in 1868), Russian Geological Society, All-Russian Mineralogical Society and the largest educational and scientific centres of St.-Petersburg were the principals of the Symposium. About 70 scientists and practitioners from Russia, Ukraine and Germany participated. Previous symposia were held in 2002, 2004 and 2007.

The topics of the conference were:

- General and particular cycles of nutrients.
- Biomineralization.
- Interactions in microbial ecosystems and symbiogenesis.
- Molecular mechanisms of bio-geo interactions.
- Biogeochemical barriers in ecosystems.
- Nano-particles in bio-geo systems.
- Cultural heritage preservation.
- Medical geology.
- Biomimetic synthesis of new materials.

The symposium was devoted to the discussion of fundamental and applied aspects of bio-geo interactions in modern ecosystems. The main objective was to combine the views on the processes of interaction of biogenic and abiogenic systems of experts working in different areas of Earth sciences, biology, chemistry, soil sciences, medicine, ecology, material science and cultural heritage.

The Medical geology section was successful. 15 oral presentations were made by the members of the Medical Geology Division of Russian Geological Society and IMGA RD Russia-NIS from the scientific centers and universities of Omsk, Tomsk, Saint-Petersburg, Nizhny Novgorod, Yaroslavl and Kyiv and their foreign colleagues from Germany, including:

Radioactive Nanominerals in Human Blood and The Response of Geochemical Anomalies in the Elemental composition of Living Organisms, Natalia Baranovskaya, State Polytechnic University of Tomsk.

Pathogenic Mineral Formation in Human Organism, Olga Golovanova, State University of Omsk.

Intramolecular Isotope Fractionation as a New Sort of the Information about Physical and Chemical Conversions in the Eco Systems, Olga Lysenko, Research Institute for Environmental Geochemistry of National Academy of Sciences of Republic of Ukraine.

The apatite-gelatine-nanocomposities: research, development, and application, R. Kniep (the managing director of the Max-Planck Institute for Chemical Physics of Solids (MPI-CPfS, Dresden, Germany).

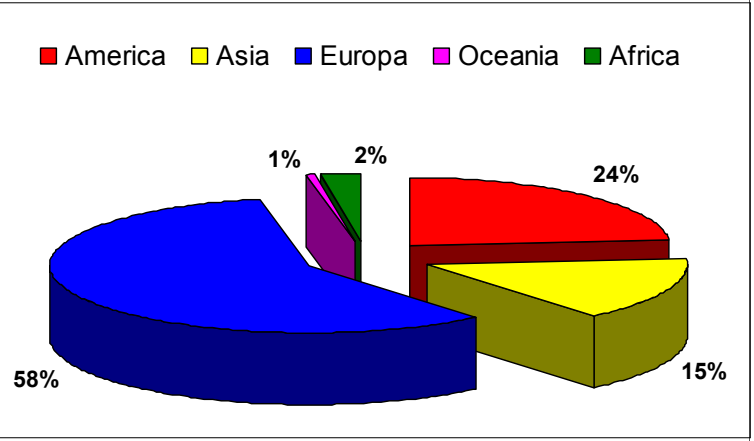
A Modern Look at the problem of Environmental Aspects of the Use of Phosphate Fertilizers, Natalia Krasnova, Saint- Petersburg State University.

PAST EVENTS: GEOMED 2011

4TH INTERNATIONAL CONFERENCE ON MEDICAL GEOLOGY - GEOMED2011: *Geological and Medical Sciences for a Safer Environment.* *Bari, Italy, 20-25 September, 2011*

The 4th International Conference on Medical Geology – GEOMED 2011 took place in Bari, Italy, from 20-25 September, 2011 at the Sheraton Conference Centre. The conference organizing committee was headed by Saverio Fiore (Environmental & Medical Geology Lab., Institute Methodologies Environmental Analysis).

Final registration was 283, from 50 different countries, with the origins of the latter shown in the pie diagram to the right. There was a perfect representation among male and female participants but few students. The final number of abstracts was 269.



Following the opening lectures, there were 147 oral and 122 poster contributions in six themes, with the number of sessions and the percentage of presentations in each, as shown in the table below.

THEME	SESSIONS	% OF PRESENTATIONS
Biominerals & Biomaterials	2	7
Environmental Toxicology & Epidemiology	5	17
Minerals & Environment	3	23
Air, Soil & Water Pollution & Quality	3	13
Risk Assessment & Communication	4	20
General topics included Radioecology and Environmental Radioactivity	5	21

Daily scientific activities started with a contribution of plenary interest:

Wednesday 21: Health and Earth - Medical Geology Building a Safer Environment (José A. Centeno, Armed Force Institute of Pathology, Washington, USA)

Thursday 22: Environmental Health Risk of the Fukushima Nuclear Power Plant Accident (Hiroshi Yasuda, National Institute of Radiological Sciences, Chiba - Japan)

Friday 23: Antibacterial Clays and their Potential for Medicinal Applications (Linda Williams, Arizona State University, Tempe, USA)

Saturday 24: Arsenic in Drinking Water Causing Skin and Internal Cancers: an Emerging Environmental Pandemic (Chien-Jen Chen, Genomics Researcher Center, Taipei-Taiwan, China).

These contributions were collected in the Book of Abstracts edited by Claudia Belviso, Saverio Fiore, & Maria Luigia Giannossi (ISBN978-88-7522-041-9), published by Digilabs (Italy).

PAST EVENTS: GEOMED 2011 Cont.

There were two pre-conference activities:

A Short Course on Medical Geology, an opportunity for geologists, geochemists, biologists, occupational and environmental scientists, medical professionals, and any other health, environmental and geo-sciences professional, for forming contacts and networks between professionals working in different areas of environmental and human health.

A workshop on Clinical cases of urinary calculi in Italy to show scientifically broad aspects in the field of stone disease. Scientists of different specialities and fields met to exchange new ideas and knowledge in the history, epidemiology, pathogenesis, diagnosis and medical/surgical treatment of urinary stones.

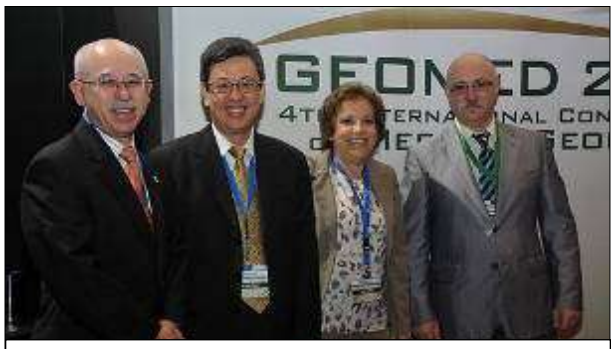
The conference fees included several services and free activities such as the welcome party, daily lunches, urban buses tickets, wine & cheese party, social dinner, and two cultural excursions (to Sassi di Matera and to Castel del Monte and Cathedral of Trani. Sassi di Matera and Castel del Monte, UNESCO World Heritage sites).

Sassi di Matera

Castel del Monte

Many organizations, foundations, and companies supported the conference and the pre-conference activities.

Josè Centeno



From left José Centeno, Chien-Jen Chen, Nelly Mañay and Saverio Fiore

Hiroshi Yasuda

Lynda Williams

PAST EVENTS: GEOMED 2011 AWARDS

AWARDS AT THE BARI CONFERENCE

I. Awards for Lifetime Recognition of Service to IMGA

Kim McAuley

Dr. Kimberley McAuley has been affiliated with the International Medical Geology Association since 2005 and has held numerous positions for the Association including Secretary and Head of the By-Law Committee. She has a background in Pharmacology, Toxicology and Public Health, completing her postgraduate research in water quality and disease burden (more specifically, adverse pregnancy outcomes and asthma). She recently served as an Issue Editor for the Encyclopaedia of Environmental Health and is currently a Research Assistant Professor within the School of Population Health at the University of Western Australia, heading a project investigating potential fetotoxic agents in the public water supply.

Kimberley wishes to express her sincere thanks to the Association and its members for this award.

Saverio Fiore (Left in photo)

Saverio Fiore, Chairman of the 4th International Medical Geology Conference (GEOMED 2011) and President of the Italian Chapter on Medical Geology. Saverio Fiore is Senior Researcher at the Institute of Methodologies for Environmental Analysis, National Research Council of Italy (IMAA-CNR).

Dr. Fiore was awarded with the Lifetime Recognition Service to IMGA during GEOMED 2011 for his remarkable and outstanding contributions to the development of medical geology worldwide. Dr. Fiore's leadership as Chairman of GEOMED 2011 attracted over 250 participants from over 50 countries. IMGA is proud to recognize Prof. Dr. Fiore for his lifetime dedication, commitment and contributions to the global development of medical geology. Saverio Fiore has been a member of the scientific board of many national and international conferences and he chaired the XIV International Clay Conference (2009) and the 4th International Conference on Medical Geology (2011). He served as President of the Italian Association for the Study of Clays and currently he is councillor of the International Association for the Study of Clays. He founded and headed the Environmental and Medical Geology Laboratory at IMAA-CNR and now is the chief of the CNR Research Group Micro and Nanominerals in the Health and Environment.

II. Award of Appreciation in recognition of outstanding contributions to an IMGA affiliated organization.

Robin Stombler
International Registry on Pathology. A Special Recognition Award for Outstanding Support to the development of Medical Geology worldwide and for improving opportunities for young students in Medical Geology.

III. Young Research Investigator on Medical Geology

Dr. Maria Luigia Giannossi, *giannossi@imaa.cnr.it***,** is a geologist with expertise in the area of biominerals, in particular urinary stone analysis (mineralogical and crystallochemical characterization) and environmental influence. In 2010 she obtained her Ph.D. Degree in Earth Science at the University of Basilicata (Italy) with a thesis on The study of Pathological Biominerals in Humans: Compositional Features and Environmental Influence on Basilicata (southern Italy) case study.

She has currently a research grant with the Laboratory of Environmental and Medical Geology (LGMA) of the Institute of Advanced Methodologies for Environmental Analysis (IMAA) - Italian National Research Council (CNR). Her professional experience includes also research activity in the field of mineralogy and geochemistry aimed at environmental and health protection. She has expertise in methods and techniques for: geological survey; traditional and advanced textural characterization of minerals and geo-materials and mineralogical characterization through X-ray diffraction technique.

She has been appointed Secretary of the Italian Association for the Study of Clays (AISA), which is a non-profit institution in charge of promoting the study of clays and their applications through seminars and training schools.

In the 2010 She was chosen among the 200 Italian talented young researchers taking part in the TNT Festival which is the first event devoted to the Italian talented young researcher promoted by the Ministry of Youth. Ms. Giannossi has been part of the organizing committee for the fourth International Medical Geology Conference in 2011.

IV Best Oral/Poster Presentations

Outstanding Student contribution
Awarded copies of the book "Regional Synthesis of Medical Geology"

Brittany Merola *rbm11@duke.edu*

David Damby *d.e.damby@dur.ac.uk*

I joined the Institute of Hazard, Risk and Resilience at Durham University, UK in order to explore the surface activity of environmental particulates at the biological interface. My work focuses on the respiratory health hazards of volcanic ash in densely populated areas, specifically in communities with little or no access to health care, which allows me to marry my research interests in immunology and geology with disaster mitigation.

The interdisciplinary nature of this research emphasizes my belief that a complete toxicological understanding of particle induced diseases is incomplete without a full appreciation of the mineralogical and geochemical properties of natural particulates. As these properties strongly depend on the conditions of formation, I aim to elucidate the extent to which the aetiology of exposure-induced chronic disease can be traced to the source geology. Such a multilateral approach enables a link between hazard assessment and knowledge of exposure to ultimately aid disaster managers when facing crucial and urgent decisions over the safety of populations and workers.

IRP cash prize awards
Elsa Giubilato
Harumi Ramos

The Italian group of AIPEA (AISA onlus) gave two awards for the best oral and poster presentations:

Oral Laura Ruhl *lsr3@duke.edu*
Laura Ruhl is currently a PhD candidate in the Earth and Ocean Sciences division of the Nicholas School of the Environment at Duke University. Her research has consisted of evaluating the environmental impacts from the 2008 Tennessee Valley Authority coal ash spill and determining the extent of impact from power plants on water bodies in North Carolina. She has also worked to develop the geochemical and isotopic characteristics of coal combustion products (CCPs) to develop a "fingerprint" of CCPs from various coal sources and to trace them in the environment. In the future, Laura would like to continue research in medical geology, especially looking at water contamination and medical mineralogy. Laura is from Ft. Myers, FL and received her BS in Geological Sciences and MS in Geological Sciences from the University of Florida.

Poster Ktso Nghargbu *nghargtbu@yahoo.com*
See page 48 for article by, and page 55 for information on and photo of Ktso Ngharbu.

V Travel Award

Professor Nelly Mañay PhD is a Chemical Toxicologist and Head Professor of the Department of Toxicology and Environmental Hygiene at the Faculty of Chemistry of the University of the Republic (UdelaR) and forensic chemical advisor at the Justice Court of Uruguay.

Her main toxicological research qualifications and publications are focused on environmental and analytical toxicology, metals exposure, biological monitoring and heath impacts in different vulnerable uruguayan populations.

Her toxicology research team has been involved in Medical Geology research since 2002, studying metals and metalloids exposure and environment health impacts within the Medical Geology International group (IGCP Project # 454) and afterwards, as a founding member of the International Medical Geology Association (IMGA), created in 2005. She has acted as the South American Division coordinator together with Cassio Silva from the Geological Survey from Brazil to promote Medical Geology in this part of the world.

Her contributions to IMGA have been developed in several scientific activities which were carried out in Uruguay, regionally and world-wide, strengthening the integration between the biosciences, public health and geoscience communities by facilitating research and training opportunities among them. In the International Year of Planet Earth (IYPE, a United Nations initiative with global activities) 2007-2009, where Earth and Health (Medical Geology) was one of the central topics, she was invited to join the Science Program as a SIT member.

Elected to hold the 3rd Hemispheric Conference on Medical Geology in Montevideo, the week of October 12-17, 2009 she was named as the Chairperson of this important event for our Medical Geology scientific community.

In addition, Professor Manay is the current executive committee elected President of the Uruguayan Society of Toxicology and Ecotoxicology (S.U.T.E.) and the executive committee elected Secretary of the Latin American Association of Toxicology (ALATOX), an IUTOX Member Society. Her group is also a delegate member to the Chemical Pollutants & Environmental Health Institutional Advisor Committee created by a Uruguayan Executive Power decree, since 2004 as an initiative of the Ministry of Health. This committee discusses common and interdisciplinarity subjects which involves environmental and health problems with the different professionals' point of view to advise the authorities to take into account in their official decisions.

VI Recognition award (Certificate) for an affiliated organization/association, the Geological Association of America

Geological Society of America, GSA, has been recognized as an Active Honorary Chapter of the International Medical Geology Association with all the rights and privileges pertaining thereto. Bob Finkelman (left in photo) received the award from Jose Centeno (right).

Recognition award (Certificate) for an IMGA Chapter

The IMGA Regional Division of Russia - N.I.S. The IMGA Special Chapter Recognition Award for a most significant impact on the development of Medical Geology in the region.

The IMGA Regional Division of Russia-N.I.S. was established in March 2006 at the annual meeting from the Russian Geological Society Medical Geology Division (MGD ROSGEO). The founding of the IMGA Regional Division of Russia-N.I.S. (IMGA RD Russia-N.I.S.) was organized through cooperation between the MGD ROSGEO and the IMGA council. Since 2005, MGD ROSGEO has maintained an organization to promote contact between the IMGA and the N.I.S. medical geology communities. IMGA RD RUSSIA – N.I.S. is a voluntary association of scientists – geologists, geochemists, mineralogists, geophysicists, physicians, chemists, biologists, microbiologists, medical scientists and others who study the effects on human health of geological processes, materials (minerals, ores, volcanic emissions, atmospheric dust, water and soils) and other natural effects. The purpose of IMGA RD RUSSIA – N.I.S. to bring together specialists, scientists and practitioners working in different areas of knowledge, to unite their efforts, and encourage collaboration on this rapidly developing field of the science. The main purpose of IMGA RD RUSSIA – N.I.S. activities is to support the studies in the field of medical geology in the territory of the Russian Federation and Newly Independent States.

VII IMGA Award of Appreciation (Certificate)

Iosif Volfson
Is awarded a special recognition for contributions in the development of medical geology in Russia

Mr. Iosif Volfson has been with geological organizations of Russia since 1979. He has been science secretary of the Russian Geological Society since 2009. His professional experience includes the development and management of projects in geological mapping, mineral prospecting, environmental geology, geochemistry and mineralogy. Since 2009 he has worked as a Science Secretary of the Russian Geological Society (ROSGEO). Chair of ROSGEO Medical Geology Division (since 2004). Chair of IMGA RD Russia - NIS (since 2006). He has carried out an active work in popularization and promotion of the knowledge in the field of Medical Geology in Russia and NIS.

He is the editor of *Medical Geology in Russia and NIS* and Chair of the Medical Geology Division of the Russian Geological Society. He is co-author of four collective monographs in medical geology, numbers of papers on actual problems in environmental geology, medical geology, and social and medical aspects of geological surveys, prospecting and mining. He participated at 33IGC (Oslo, 2008), International Symposium on Bio - Inert Interactions (Saint-Petersburg, 2004, 2007, 2011), International Conference on Environmental Problems of Mineral-Raw Materials Mining (Varna, 2011), International Conference on Actual Problems of Modern Geology, Geochemistry and Geography (Brest, 2011), First Russia-Armenia Workshop in Actual problems of Chemistry in Development of Ecology, Energetics, Biotechnology, and Nanotechnology (Yerevan, 2011). The IMGA Regional Division Russia - NIS (established in 2006) is composed of professors and professionals of different disciplines such as occupational medicine, pharmacology, geology, environmental geochemistry and mineralogy and chemistry and Iosif became the Chair of the Division in 2006. The IMGA RD Russia - NIS now has members from the Ministry of Natural Resources and Ecology of Russia who are researching the impacts of geological factors in public health connected with current laws and procedures. Mr. Volfson 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 Russia and the NIS.

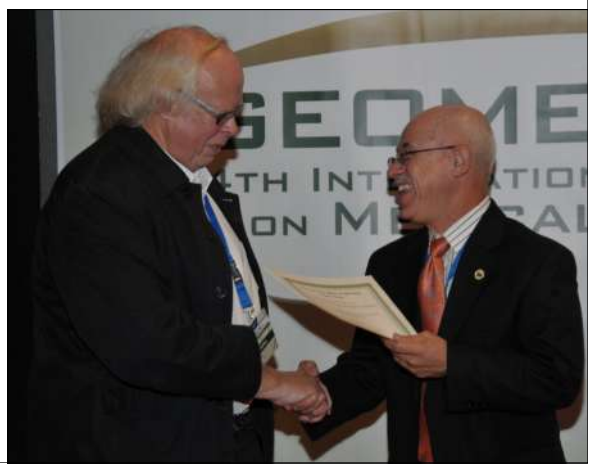
VIII Certificate of Recognition

For the Student Organizing Committee of the First International Symposium of Medical Geology, Autonomous University of Chihuahua.

IX Special chapter recognition

The Portugese chapter received a special chapter recognition award which was presented to Rita Salgueiro, Portugal, as a member of the Portugese chapter.

Chapter certificates for new chapters
New chapters received their certificates, Swedish chapter (right, Dr. Olle Selinus) and the Argentinian chapter.



VIII IBERIAN GEOCHEMISTRY CONFERENCE / XVII GEOCHEMICAL WEEK.
Quinta da Senhora de Mércules, Polytechnic Institute of Castelo Branco (Portugal), 24 - 28th September, 2011.

For information, see the webpage: *http://cigeoq2011.ipcb.pt/portugues/index.html*

THE IST INTERNATIONAL SCIENTIFIC CONFERENCE ON ACTUAL PROBLEMS OF MODERN GEOLOGY, GEOGRAPHY AND GEOCHEMISTRY. *Brest State University (BrGU) (named after Alexandr Pushkin), Brest, Republic of Belarus, September, 27-30, 2011*

The Department of Geography of BrGU, the Russian Geological Society, the National Academy of Sciences of the Republic of Belarus, the Ministries of Natural Resources and of Education, and the largest scientific centers of Belarus, such as the Scientific-Research Institute BelNIGRI were the principal organisers. About 70 geologists, geographers, environmentalists, geochemists from Belarus, Poland, Russia and Ukraine participated in the conference. The organizing committee was supported by medical geologists from Kazakhstan who prepared some articles for the book of proceedings of the Conference. There were 5 sections in the programme:

Actual problems of modern geology.
Geological survey and prospecting of mineral deposits
Rational management of natural resources and environmental safety.
Geochemistry of natural landscapes and urban territories.
Theory and methodology of modern geography.
A section on Medical geology, geochemistry and geography was included in the programme of the Conference on the occasion of the Fifth Anniversary of the establishment of the IMGA RD NIS (2006 - 2011).

Oral presentations of the leaders of medical geologists of NIS included:

Academician Nickolai Yushkin, (world famous mineralogist from the Ural Scientific Center of Russian Academy of Sciences). Biomineral coevolution.
Sci. Dr. (in Geology, Geography, Economics) Georgy Rud'ko (Kyiv, Ukraine). General thesis of medical geology as a new field of the science.
Iosif Volfson and Evgeny Farrakhov (Moscow, Russia, ROSGEO). Medical Geology in NIS.
Alice Drozdovskaya (Kyiv, National Academy of Sciences of Ukraine), Medical geology in the aspect of the problem of the influence of cosmogenic fields of the Planet of Earth on the biosphere
Andrey Kovhuto and Maria Onoshko (Minsk, Belarus, BelNIGRI). Current status and perspectives of investigations in medical geology in Belarus (the scientific heritage of member-correspondent of the National Academy of Sciences of Belarus Valentine Lukashov. Valentin Lukashov was one of the founders of Medical Geology in 1990 and died in 1998 at the first Medical Geology planning meeting in Sweden)

The Ukranian scientist Georgy Rud'ko presented a book titled, Vstup Do Medichnoi Geologii (Introduction to Medical Geology, in Ukrainian, published in Kyiv in 2010. (See backpage of the Newsletter) . This is a two volume edition written by a collective of Ukrainian authors.

We thank Sci. Dr. Maxim Bogdasarov, Head of the Medical Geology Division of the Republic of Belarus. He is the Head of Geography Chair of the State University of Brest and contributed a lot to the organization of this interesting Conference.

THE 1ST. RUSSIAN - ARMENIAN WORKSHOP IN ACTUAL PROBLEMS OF CHEMISTRY IN THE DEVELOPMENT OF ENVIRONMENTAL SCIENCES, ENERGY, BIOTECHNOLOGY, AND NANOTECHNOLOGY.

At the Office of the Presidium of the National Academy of Sciences of Republic of Armenia in October. organized on the basis of recently established Russian-Armenian Center of Innovations,17 – 21 October, 2011.

One more very important scientific event was held in Yerevan (Armenia) . On behalf of IMGA RD NIS, Iosif Volfson lectured as an invited speaker on Chemical Aspects of the Environment. He presented Medical Geology as a branch of environmental sciences which interests perfectly correspond with many tasks of the community of chemists who work on the problems of fundamental and applied chemistry, biotechnology, pharmacology, ecology as well as nanotechnology. Nanotechnology for instance causes macro environmental and medical problems which could have been explained from a medical geology point of view through the data obtained by medical mineralogists and geochemists. One of the organizers was the Director of the Centre of Ecological and Noospheric research of the National Academy of Sciences of the Republic of Armenia and head of Armenian National Chapter of IMGA RD NIS, Armen Saghatelian. Iosif Volfson visited the center (*www.ecocentre.am*) and lectured on Medical Geology in NIS countries for 5 years together. An agreement on collaboration between the Centre of Ecological and Noospheric research and ROSGEO was signed.

It is worth saying that the medical geology community of NIS, scientists of Russia and Armenia as well other NIS countries has entered into a new phase. These changes are very attractive for the World Medical Geology Community. NIS scientists are becoming more open for IMGA initiatives.

GEOLOGY AND HEALTH TECHNICAL SESSIONS AT THE MINNEAPOLIS GSA MEETING
October 9-12, 2011

Mineralogy, Geochemistry, and Physical Properties of Atmospheric Mineral Dust: Influences on the Atmosphere, the Cryosphere, Ecosystems, and Humans.
Richard L. Reynolds, Joshua Feinberg, Suzette A. Morman
This session emphasized the mineralogy, geochemistry, and physical properties of contemporary dust to understand the influences of atmospheric particulate matter on climate, weather, snow- and ice-melt, human health, landscape fertility, and ocean fertilization

Impact of Winter De-Icing Chemicals on the Environment
Rudolph Hon, Walton R. Kelly, Samuel V. Panno
Winter de-icing chemicals on road surfaces create many environmental problems including deterioration of public water supplies, interference with aquatic life environments, and infrastructure corrosion.

Pathogens and Faecal Indicators in Soil, Groundwater, and Surface Water
Larry D. McKay, Mark Borchardt
This session examined faecal contamination from a variety of perspectives, including detection, transport, survival, modelling, regulation, and management.

Recent Advances in Studies of Dissolved Arsenic and Other Metals in Global Hydrologic Systems
Prosun Bhattacharya, Abhijit Mukherjee, D. Kirk Nordstrom, Holly A. Michael, Jochen Bundschuh
The session focused on studies of hydrological, chemical, and biogeochemical processes controlling the fate of dissolved arsenic and other toxic metals and their effects on public health and water management.

International Development and the Geosciences
Jeffrey Greenberg, Michael D. Guebert
Presentations included a wide variety of case studies demonstrating the practical application of geoscience in serving the global needs of people and their environment.

Sources, Transport, and Fate of Trace and Toxic Elements in the Environment
LeeAnn Munk, David T. Long, W. Berry Lyons
Relevant research dealing with trace and potentially toxic elements in the environment. Basic and applied research topics on trace elements in water, sediment, and rocks that relate to sources, transport and fate are encouraged.

A Healthy Society, Geosciences, and Natural Resources
Catherine Skinner, Eric Cheney
This interdisciplinary session stressed positive outcomes for some of the major environmental and medical issues that are dependent on the availability and use of fuel, mineral, and water resources to be healthy.

Intersection of Geology and Health: Impacts of Geologic Materials on Public Health
Geoffrey S. Plumlee, Jean M. Morrison
This session highlighted the potential impacts of geologic materials (urban and natural soils, mine wastes, oil spills, smelter emissions, coal fly ash, wildfire and volcanic ash, etc.) on public health.

Coal Combustion Products and Impacts on the Society
Avner Vengosh
This session addressed the impact of coal combustion products on the environment and society through interdisciplinary evaluation of the science of coal ash, its disposal to the environment, and the social implications.

Water and Health
Saugata Datta, Syed E. Hasan, Hatim Sharif, Deon van der Merwe
This session focused on the effects of drastic or abrupt climate changes on human and ecological health as they relate to water-quality issues.

Advances in Characterizing Sources and Release of Naturally Occurring Trace Elements to Aquatic Systems and Groundwater
Sarah L. Nicholas, Brandy M. Toner
The session focused on characterizing sources and mechanisms of release of naturally occurring trace elements to waters.

2ND INTERNATIONAL CONFERENCE ON GEOPHAGIA IN SOUTHERN AFRICA (2ND ICGSA), *University of Venda, South Africa, 19 - 21 October, 2011.*

A. Momoh, Department of Mining and Environmental Geology, abkenomai@yahoo.com

The 2nd International Conference on Geophagia in Southern Africa was held jointly with the 1st International Conference on Clays and Clay Minerals in Africa at the Central University of Technology, Bloemfontein, South Africa, 19 - 21 October, 2011. The Meeting was organised by the African Clays and Clay Minerals Research Group under the auspices of the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the International Union of Geological Sciences (IUGS), the International Geological Correlation Programme (IGCP) and the National Research Foundation (NRF) of South Africa.

The theme of the joint Meeting was, An innovative perspective on the role of clay, clay minerals and geophagia on economic development. The Conference served as a forum for presenting the output from research initiatives and efforts that aim to bring an understanding of clays, clay minerals and geophagia in the continent.

The objectives of the Conference were to encourage governments, universities and industries to reconsider current contemporary exploitation practices of clays and to serve as a vehicle for bringing understanding of clays and clay minerals in Africa. The forum also served as a platform for incorporating existing and newly generated knowledge on clays and clay minerals into globally appreciable and stringently acceptable mainstream knowledge.

According to the Conference convener, different theories and interpretations of both geophagic soils and geophagic practices have been advanced by scholars (Ekosse, 2011). Geophagia, which is the deliberate and purposeful (but also sometimes inadvertent) ingestion of soils, has been in existence for many years in several parts of the world. It has been related to nutritional, psychological, cultural and medicinal, social, religious/spiritual, and ritual needs. The consumption of geophagic soils and clays is criticized as unhygienic, exposing consumers to toxic constituents in soils such as heavy metals and parasites. There is still a dearth of knowledge on aspects of mineralogy, geochemistry, microbiology, ecology, and human and environmental health associated with geophagia in Southern Africa. Nor have the nutritional, pharmacological, and physiological effects on geophagic practitioners been agreed on and understood by the scientific community. It thus became imperative to characterize geophagic soils and clays, and relating existing indigenous knowledge systems (IKS) of geophagia, to scientific findings (Ekosse, 2011).

The Conference attracted a large group of multidisciplinary participants including geologists, mineralogists, geochemists, soil scientists, environmental lawyers, and nutritionists, from Russia, Zimbabwe, South Africa, Nigeria, Cameroon, India, the United States and Germany. About 70 papers were presented in two parallel and plenary sessions during the three-day event. The deliberations of the joint Conference were covered in two sections.

Section (I): Clays and Clay Minerals in Africa

A guest lecture entitled, Clays, Natural Resources and Economic Development with Special Reference to South Africa, was delivered by Ramontja. In his presentation, the author clarified that clay mining in South Africa is practised in both formal and informal sectors; the informal sector is unregulated and illegal, in terms of South Africa mining law, even though this sector plays an important role in the economy of the country, e.g. in the building of clay and brick houses in rural areas. The formal sector is regulated and supplies clay to various downstream industries. Local sales by weight of brick clay have been on the increase from 2000 to 2009.

A paper entitled, Clay - What Has Law Got to Do with It? was presented by Anyangwe. The speaker clearly demonstrated the relevance of the "law" in the subject matter of clay. Clay is an industrial mineral, and mining of clay should be regulated by law for the purpose of development, health and environmental control. He concluded his presentation by noting that courts or arbitration tribunals should take account of relevant scientific evidence about clays to resolve river or maritime boundary disputes between riparian states, e.g. Botswana vs. Namibia, Cameroon vs. Nigeria and Libya vs. Malta.,

Katende-Kyenda explained how clays are used as antiseptics, cicatrising agents, anti-inflammatory, anti-carcinogenic agents, emollients, refrigerants and cosmetics. She recommended that further work should be carried out on how effective these clays are at healing and adequate maintenance of human health in developing countries.

Section (II): Human and Enzootic Geophagia in Southern Africa
A summary embodying brief descriptions of a small selection of papers in this session follows.

A paper, Human and Enzootic Geophagia in Southern Africa, was presented by Ekosse. He reviewed the trend of research in Human and Enzootic Geophagia in Southern Africa to date. Prior to 2007, there were few or no known documented studies addressing the mineralogy, geochemistry, chemistry, mineralogy, microbiology, ecology, human and environmental health aspects associated with geophagia in Botswana, South Africa and Swaziland. The National Research Council of South Africa was able to sponsor some researches on Human and Enzootic Geophagia in Southern Africa leading to a significant improvement in research activities in 2007. Findings from this research were presented in the 1st Human and Enzootic Geophagia Conference in 2008. Ongoing research efforts in Southern Africa countries and other parts of the continent have now generated scientific data on demography, physico-chemistry, mineralogy, chemistry, haematology, human and environmental health applied to geophagy.

de Jager and Ekosse discussed knowledge, attitudes and beliefs of traditional healers regarding geophagic practices in Central South Africa. Traditional healers prescribe soil for ailments such as infertility, bleeding, abdominal pain and chest pain, because soils have medicinal properties.

Mineralogical characteristics of consumed Earth materials from Vhembe District, South Africa were assessed to test the "protection hypothesis" by Momoh et al.

An appraisal of selected properties and nutritional value of geophagic materials from Swaziland and some areas of Eastern Cape, South Africa, was given by Ngole et al. These geophagic samples varied in mineralogical and chemical composition, but fell within a compositional range similar to that of geophagic samples reported from other parts of the world.

Toxicological aspects of geophagia in pregnancy were discussed by Mossanda and Asare. They opined that despite detoxifying phytotoxin properties of clay, lowering the incidence of nausea, natural clay still remains toxic for human consumption in normal and long term conditions.

Compositional characteristics of geophagic clays from parts of Southern Nigeria were discussed by Okunlola and Owoyemi. The mineralogical composition compares favorably with geophagic clays from other parts of the world. The occurrence of beneficial bacteria (*Streptomycetes)* in edible clays from Vhembe District, South Africa was discussed by Momoh et al. Some geophagists claim that the bacterium in these clays improves their well being, and inhibits the growth of harmful bacteria. These assumptions were confirmed by the presence of

Streptomycetes which are known to possess antimicrobial properties.

Sumbele et al. described health risks that were associated with geophagic practices in Eastern Cape Province, South Africa. Geohelminth infection and Cr toxicity were the identified health risks in the area. Geophagia amongst antelope at pans in Kalahari was discussed by Butler et al. They noted that antelopes have diverse preferences for soil throughout varying environmental conditions. Jooste and Butler demonstrated geophagy and mineral preference by Gemsbok (*Oryx gazella*) in Southern Kalahari. They found that Gemsbok consume soil for two reasons; mineral supplementation and counteraction of acidosis.

In the closing session, participants were tasked to look inward on issues of livelihood from geophagic practice, and price chain in distribution of geophagic materials from Africa to Europe, America, Australia and Asia. Also of interest was how indigenous knowledge could be linked to experimental science. Very little is known about the local perception of geophagists in these communities in relation to experimental science.

Plans are under way to publish a book covering several aspects of the discipline encompassing geophagic practice in the continent.

The next conference on Clays, Clay Minerals and Geophagia will be held in 2013 at the same venue.

REFERENCE

Ekosse, G-IE**,** 2011. Foreword: Book of Programme and Abstracts, 1st International Conference on Clays and Clay Minerals in Africa and 2nd International Conference on Geophagia in Southern Africa; Bloemfontein, South Africa, 19 - 21 October, 2011.

Participants, 2ND International Conference on Geophagia in Southern Africa, (2ND ICGSA)

IGCP GOES DEEP! REPORT ON THE INAUGURAL WORKSHOP OF IGCP/SIDA/UNESCO PROJECT 606; UNIVEN PROJECT SES/11/MEG/03: ADDRESSING ENVIRONMENTAL HEALTH IMPACTS OF MAJOR AND ABANDONED MINES IN SUB-SAHARAN AFRICA
Johannesburg, South Africa, 10 -12 November, 2011

INTRODUCTION
We all benefit from exploitation of the abundant natural geo-resources: minerals, ores, metals and hydrocarbons with which Sub-Saharan Africa is endowed. But we are all also equally concerned to know that the exploitation and processing of these materials is done in a way that ensures that agricultural productivity of our soils is not diminished in the process, nor the environmental health of our citizens compromised.

The Inaugural Workshop of IGCP/SIDA/UNESCO Project 606; UNIVEN Project SES/11/MEG/03 was organized under the auspices of the International Geological Correlation Programme (IGCP), the Swedish International Development Agency (SIDA), the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the University of Venda (UNIVEN) in South Africa. The theme was Addressing Environmental Health Impacts of Major and Abandoned Mines in Sub-Saharan Africa. The Workshop was held at three different localities in Johannesburg, respectively, the Garden Court Milpark Hotel (GCMH), the Geology Department of the University of Johannesburg (UJ), and in the depths of the Tau Tona Mine (TTM) near Carletonville, some 3,600 meters below the surface of Planet Earth. The choice of workshop venues was dictated, in each case, by the specific sub-themes to be addressed as well as logistical considerations.

The purpose of the workshop was as a forum where representatives (from universities, mining institutions and policy makers) from the major mining countries in Sub-Saharan Africa could exchange ideas on the best ways of attaining the long-term objectives of the project, and as a catalyst for the development of new collaborations and research interactions. Some of the anticipated long-term outputs of the project identified during the project development stage, are:

- Establishment of critical levels for specific potentially harmful elements (PHEs) and their patterns of migration into various compartments of the ecosystem;
- Determination of the impact of increased PHE loadings from mine spoils to soil and water resources, and eventually into food crops and the food chain;
- Formulation of practical guidelines for eliminating or reducing the associated environmental health risks to consumers of food crops from the affected areas;
- Recommendation of the best possible technology and other strategies for remediation and rehabilitation, including aspects of implementing phytostabilisation, such as plant growth stage, amendments, irrigation, eluviations, etc.

The Workshop attracted about 40 interdisciplinary participants, mainly geoscience, from Algeria, Cameroun, Ethiopia, Germany, Ghana, Kenya, Namibia, Nigeria, Sierra Leone, South Africa, Tanzania, the United Kingdom and Zimbabwe. Twenty Workshop presentations, including the keynote speech, reflected the breadth of the project theme, and inspired much debate. The workshop covered seven sessions as follows:

- An Opening Ceremony;
- Three Scientific Sessions
- A Field Visit to the Tau Tona Mine;
- A Business Meeting
- A Workshop Summary and Resolutions Session.

OPENING CEREMONY

Highlights of a colourful opening ceremony featured addresses by Professor T.C. Davies (Project Leader and Chair of the Organising Committee); Professor Hassina Mouri (Session Chair and Representative of University of Johannesburg Management); Dr. Felix Toteu (Earth Science Specialist, UNESCO); Professor Jan E. Crafford (Deputising for the Vice Chancellor, University of Venda); Dr. Benjamin Mapani (Project Co-Leader and Representative of the International Union of Geological Sciences' Commission on Geosciences in Environmental Management (IUGS/GEM) and Mr. Cornelius Hagenmeier (Director, International Relations, University of Venda). These speeches were followed by a keynote address, Abandoned Mines: Toxic Legacy or Post-Mining Business Opportunity?, delivered by Dr. Markus Reichardt (Managing Director, P.E. International (S.A.) (Pty) Ltd.

A common thread running through the opening addresses was "the fostering of sustainable high technology mining activities for profitability, with environmental etiquette that ensures the maintenance of healthy, wholesome ecosystems and communities".

SCIENTIFIC SESSIONS

The frequency of occurrence and depth of coverage given to various sub-themes within the project mandate in the three scientific sessions (held at UJ), broadly reflected the seven focal areas identified during the Business Meeting (held at GCMH) for detailed investigation during the next phases of the project. These included:

- Mapping of abandoned mines and production of a GIS database for Sub-Saharan Africa; and addressing their environmental and health impacts.
- The proper disposal of solid and liquid mine waste, including mine wastewater management, and tackling the intractable problem of acid mine drainage (AMD).
- The release from mine sites and tailings dumps of PHEs, their geochemical circulation in the water-, air- and soil environment; and, especially, their uptake by food crops and consequent interactions in the food chain. This should be studied in relation to their effect on the health of those who consume associated food crops.
- The impact of uranium mining and processing on the environmental health of miners and nearby residents of mining communities.
- Eliminating or mitigating the environmental health impact of dust emitted from the mining and processing of siliceous ores and coal, and also of dust given off during movement of heavy vehicles and other machinery in mining compounds.
- Improved techniques for mitigation and rehabilitation of mines.
- Physical impacts, such as deaths due to mine collapse, and injuries due to operation of machinery.

Session I

Six presentations were scheduled for Session I. In the first paper, Schlüter and Khumalo (not presented) contemplated the pros and cons of rehabilitation and re-opening of the Ngwenya Iron Ore Mine in Swaziland, as against its designation as a UNESCO World Heritage Site. Obiora showed why a systematic compilation of major and abandoned mines in Nigeria is an essential first step in tracing the migration pathways of PHEs emanating from them and in evaluating the environmental and health effects of these elements. The paper by Yibas and Zhao advocated the standardization of techniques in the assessment, prediction and management of the pervasive problem of AMD in continental Africa. In their contribution, de Mowbray et al. described practical applications of methods which support the removal of mercury and other toxic chemicals from the artisanal gold mining process. Lar followed up with a consideration of the environmental health impacts of some major

and abandoned mines in Nigeria, proffering mitigation and rehabilitation measures. In the final paper of Session I by Momoh, Dibal and Mhlongo, the danger posed to health by PHEs from mine wastes was again brought to the fore, in their presentation, Potential health impacts of human exposure to As, Cr, Pb, Co, Cd and U from abandoned mine ponds on the Jos Plateau in Nigeria.

Session II

The topic, the migration of PHEs from mine sites into the water and soil environment, and eventually into the food chain, dominated the proceedings of Session II, where 5 presentations were given. Mapani commented on certain important terminologies in environmental geochemistry, and indicated their proper usage in different situations. Gitari, Petrik and Madzivire then described an innovative utilization of alkaline industrial solid residues (fly ash) for remediation of metal contaminated acidic effluents. The paper by Dibal and Yakubu (not presented) discussed the implications to the food chain of anomalous concentrations of PHEs in waters, soils and some edible cultivated vegetables around abandoned mine ponds of the Ray-Field areas of the Plateau State in Nigeria. The theme of, PHE release from mine dumps and their subsequent fate, was continued in the paper presented by Meck, Love and Mapani, referring particularly to toxic metals/elements in soils and mine dumps in Zimbabwe. The final paper by Kalender (not presented) also on the same theme, looked at bioaccumulation factors of PHEs in different plant species in relation to water, sediment and soil environment in a mining district in Turkey.

Session III

The first paper in this final technical session was by Toteu, who presented UNESCO Nairobi Offices broad mandates and policies towards the Earth Sciences in Africa. Nelushi, Gumbo and Dacosta then took up a major project sub-theme (rehabilitation of abandoned mines) in their presentation entitled, An investigation into the bioaccumulation of chromium and uranium metals by Cynodon dactylon. A case study in an abandoned New Union Gold Mine tailings, Limpopo, South Africa. Macheyeki provided measurements, and explained the significance of enhanced toxic metal levels in soils of major metal mines and smelters in Tanzania. Matshusa demonstrated the efficacy of using geo-environmental modelling techniques in explaining perturbations in PHE loadings and the environmental health consequences observed at Klein Letaba and Louis Moore tailings dams in the Giyani Greenstone Belt of South Africa. The paper by Maiyana (not presented) described the application of conductivity measurements in tailings dams in the Witwatersrand Basin in tracing contaminant behavior and migration pathways of PHEs. Momoh, Mhlongo and Muzerengi considered possible health risks from consumption of vegetables grown around abandoned mine spoils on the Jos Plateau, Nigeria. They referred to a number of maladies thought to have occurred as a result of elevated metal uptake values in associated vegetables that were consumed. Odhiambo and Ongo recounted the impacts of artisanal gold mining on human health and livelihood in the Macalder area, Nyatike Division in Kenya. This paper highlighted the physical impacts as well as the negative social impacts associated with artisanal gold mining and suggested remediation strategies. The final paper, Addressing environmental health impacts of major and abandoned mines in Sub-Saharan Africa, presented by Davies, was a summary paper, designed to encapsulate all the previous presentations, while synthesizing the key components of the Project.

FIELD VISIT TO CARLETONVILLE

A field visit to the Tau Tona Mine near Carletonville, about 75 km WSW of Johannesburg took place in the morning hours of Friday, 11 November. The mine, over 3,500 metres deep, is one of the three Western Deep Level Mines of the West Wits Gold Field and shares processing facilities with its two neighbours, the Mponeng and Savuka mines. The mine is so deep that temperatures in the mine can rise to 55°C. Air conditioning equipment is used to cool the mine from 55°C to a more tolerable 28°C. (See page 43 for photos.)

The Wits Basin represents a phenomenal geological and sedimentological anomaly with respect to gold deposition. Several ore associations occur together with gold. It is probable that most gold was deposited via sedimentary processes, followed by hydrothermal/digenetic processes that changed the original ore constitution.

The Tau Tona is today, one of the most efficient mines in South Africa and remains in continuous operation even during periods when the price of gold is low.

BUSINESS MEETING

A Business Meeting held at 17:00 hrs. on 11 November at GCMH was attended by 22 delegates, who deliberated, inter alia, on the following:

- Proposed contribution/commitment of project participants for the next four years. It was observed that the proposals and commitments given were in line with the identified project focal areas given above. Mr. Cornelius Hagenmeier emphasized the importance of international collaboration, which could open up opportunities such as the offer of high quality analytical facilities and student exchange programmes.

- Deliverables: A task team was constituted to steer the mapping (GIS database) of abandoned mines in Sub-Saharan Africa, comprised of:
  David Ongo (Kenya); Coordinator
  Mr. S.E. Mhlongo (South Africa)
  Dr. M. Meck (Zimbabwe)
  Dr. S.F. Toteu (UNESCO Office, Nairobi, Kenya)
  Prof. B. Odhiambo (Kenya)
  Dr. B. Yibas (South Africa)

- It was agreed that a project pamphlet should be prepared as early as 2012 for wide circulation, and should incorporate items such as: project description; aims and objectives of the project; project focal areas, as well as clear definition of terms such as: “abandoned mines”, “potentially harmful elements”, “background element concentrations” and several other terms in environmental geochemistry, to obviate ambiguity in usage.

- Project Focal Areas were given above.

- Plan of Action for the Next Four Years:
  ◊ Opening Workshop
  ◊ Partial construction of database on abandoned mines
  ◊ Special Publication (in the Journal of African Earth Sciences??) on “Existing Database”
  ◊ Discuss infrastructure for data capture and storage (Dr. Felix Toteu)

- Workshop
  - ◊ Disposal of mine waste, including mine water management and AMD
  - ◊ Dust emission from mines (silicate ores and coal)
  - ◊ Workshop to be held in collaboration with IGCP Project 594
  - ◊ Executive Summary of the Project Workshop

- Capacity Building: What came out clearly from the discussions under this head, was the need to bring students together with experts from whom they can learn in forums such as was the case in project Workshop 606, a project with a strong capacity building component.

- Synergy with IGCP/SIDA Project 594: Our sister project, IGCP/SIDA 594 broadly looks at mine dumps and tailings, and their interaction with various ecosystems. It was resolved that IGCP/SIDA/UNESCO Project 606 could organise a joint meeting with IGCP/SIDA 594 sometime in 2013.

- Dissemination of Workshop Proceedings and Other Project Documents: It was resolved that all Workshop proceedings and other documented materials from the Project should be submitted for review and publication in "EPISODES", the main outlet journal of the International Union of Geological Sciences.

- Location of the Next Workshop: Two nominations were received: Nigeria (Prof. Lar), and Ghana (Dr. Dacosta). A vote was scheduled for the 'Closing Function' on Saturday evening, 12 November, 2011.

- Any Other Business (AOB): The following discussion points were addressed under AOB:
  - ◊ It was noted that a project website had been opened, but is still under construction. Delegates were required to add their names to the database
  - ◊ Noted that collaboration with other relevant institutions and departments is vital for the life of the project
  - ◊ UNESCO only provides funding for meetings and not for fieldwork.

WORKSHOP SUMMARY AND RESOLUTIONS

Summaries and discussions of the three scientific sessions re-echoed the main ingredients of the seven focal areas identified for the project (Section 3), and how best to tackle ensuing impacts. Other points that came out strongly in the summary discussions include:

- UNESCO's intervention in strengthening the 'Earth Sciences' in Africa through a number of workshops (e.g., in collaboration with the Geological Society of Africa and the African Association of Women Geoscientists).
- Recognition that Earth Science is a key driver of sustainable development, a fact that is not well understood outside of the Earth Science communities.
- The need for the introduction of Earth Science at the primary and secondary school levels.
- The need for instituting effective vehicles for dissemination and exchange of Earth Science information between institutions in the Sub-Saharan African region.
- The need for enhancement, and direction of additional resources towards geological field mapping in the geology curricula of tertiary geosciences institutions in the Sub-Region is often perceived as an expensive venture by university administrators.
- The importance of establishing IGCP centres at the national level.
- The need for acquisition of project writing skills by PhD candidates and post doctoral fellows, to enable them gain more prominence in IGCP projects, as well as other project funding activities.

Key points of the final resolutions were:

- Confirmation of the Principal Project Investigators: T.C. Davies (Project Leader); B. Mapani (Project Co -Leader), and B.D.O. Odhiambo (Project Secretary).
- Confirmation of the Project Workplan for the next three years.
- Participants were required to uphold their commitment to the ideals and objectives of the Project, to vow to effectively collaborate with the external partners, and to always be pragmatic and select realistic targets for project prosecution.
- Public awareness of mining impacts and health should be harnessed by way of information dissemination of IGCP 606 outputs through pamphlets and other communication instruments.

Finally, the choice of venue for the 2012 IGCP/SIDA/UNESCO Project 606 and UNIVEN Project SES/11/MEG/03 Workshop was decided at a ballot held during the Closing Ceremony at the GCMH, with Ghana (bidder, Dr. F.A. Dacosta) polling 15 votes, against the 5 votes of Nigeria (bidder, Prof. U.A. Lar). Thus, the next venue will be in Ghana before 2012 to give way for the 34th International Geological Congress to be held in Brisbane, Australia from 5 - 10 August, 2012.

CONCLUSION

In conclusion, it could be said that the Workshop achieved the objectives set out above. It was highly interactive and the debates were lively. The need for further collaborative and interdisciplinary studies to unravel unclear relationships between mining and environmental health in the Sub-Region was clearly brought out. The intensity of research on improvement in mitigation and rehabilitation strategies by large mining concerns augurs well for the environmental health of miners and the surrounding mining communities.

ACKNOWLEDGEMENTS

The project leaders of IGCP/SIDA Project 606 and UNIVEN Project SES/11/MEG/03 would like to express their profound gratitude to the University of Johannesburg for their kind help in hosting this important Workshop on their premises. Prof. Hassina Mouri of the Department of Geology (UJ) took care of all arrangements regarding Workshop facilities in Johannesburg. Dr. Tshilidzi Mashamba of the Department of Psychology, University of Venda, South Africa, did formatting and typesetting of the Abstract Volume and directed associated services. Mme. Adrienne Jordaan and her colleagues of the Tau Tona Mine Management Staff did a superb job in their organisation of the field visit. Project 606/SES/11/MEG/03 is sponsored jointly by IGCP, SIDA, UNESCO and the University of Venda. Financial administration was by the Finance Department of the University of Venda. Media coverage was provided by the Communications and Marketing Department, also of the University of Venda. Mme. Welheminah Mabogo and Mrs. Sharon Mashau of that Department captured every moment of the entire proceedings. We extend our sincere thanks to all these individuals and institutions for their tremendous support.

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Delegates of IGCP/SIDA/UNESCO Project 606; UNIVEN Project SES/11/MEG/03 holding a scientific session at 3,600 metres below Earth's surface at the Tau Tona Gold Mine near Carletonville, ca. 75 km WSW of Johannesburg on 11 November, 2011.

Participants moving along a tunnel at the deepest level, Tau Tona.

UPCOMING EVENTS

INTERNATIONAL CONFERENCE ON HEAVY METAL POISONING, WITH SPECIAL REFERENCE TO THE ZAMFARA CRISIS, *Abuja, Nigeria. January 11-12, 2012*

Since March 2010, MSF has been responding to an unprecedented lead poisoning crisis in Zamfara State, northern Nigeria. The response has included admitting more than 2000 children into MSF's lead poisoning treatment programme, and the remediation of lead-contaminated villages.

MSF and its partners in the Zamfara lead poisoning response will be hosting a 2-day meeting to disseminate knowledge on the medical and environmental lessons learned while containing and treating this crisis. Speakers will present data and analysis derived from their field operations since March 2010. Other expert participants will complement this with presentations on incidents of heavy metal poisoning in other global contexts. This 2-day interdisciplinary conference is an opportunity for toxicologists, environmental scientists, public health officials, and epidemiologists, along with representatives from governments and international NGOs, to meet and discuss epidemiological, clinical, and environmental approaches to combating large-scale heavy metal poisoning.

We look forward to welcoming you on the day.

NH8.2: MEDICAL GEOCHEMISTRY: PROCESSES OCCURRING BETWEEN GEOLOGICAL MATERIALS AND HUMAN/BIOLOGICAL INTERFACES *Vienna, Austria, 22 – 27 April 2012*
Conveners: P. Censi Co-Conveners: M. L. Giannossi, Y. Erel, T. Darrah, L. Randazzo

This session gathers scientific contributions about the effects on the human health of exposure to geological materials sensu lato. The geochemical approach, often focused on processes occurring in natural interfaces, is here applied to the recognition and explanation of phenomena occurring between geological materials and typical interfaces of the human body. This session welcomes presentation of research that discusses the application of geochemical principles, methods and instrumentation to the study of human health. We especially welcome contributions that focus on the unique relation between geochemistry and the diagnosis, treatment, inception and/or progression of disease. The innovative leit-motif of this session centres on the unique perspectives and approaches applied by geochemists and their potential contributions to human health-related research.

Link*: http://meetingorganizer.copernicus.org/EGU2012/session/9251*

ABSTRACT DEADLINE, 17 Jan 2012
http://meetings.copernicus.org/egu2012/abstract_management/how_to_submit_an_abstract.html

9TH INTERNATIONAL SYMPOSIUM ON ENVIRONMENTAL GEOCHEMISTRY (ISEG) 2012
University of Aveiro, Aveiro, Portugal 15-22 July 2012
Organised by Dr Eduardo Ferreira da Silva

WRONGLY REPORTED AS A PAST EVENT IN THE LAST NEWSLETTER!

This international event is jointly organized by the University of Aveiro, GeoBioTec Research Centre and the CESAM Associated Laboratory and is also supported by the IAGC - International Association of Geochemistry, SEGH, Society of Environmental Geochemistry and Health and IMGA, International Medical Geology Association. It will provide an international leading forum for scientists, consultants and public managers, working on the broad area of environmental geochemistry and health. Participants will convey expertise in a range of scientific fields, such as geochemistry, biology, engineering, geology, hydrology, epidemiology, chemistry, medicine, nutrition and toxicology. The main themes of the conference are:

1. Geochemical records of environmental changes: climate changes and human activities
2. Sustainability in mining and related environmental issues
3. Geochemistry and health & medical geology
4. Environmental toxicology & epidemiology
5. Environmental contamination and remediation
6. Water resources and aquatic environments
7. Biogeochemistry of trace elements, organic pollutants and radio-nuclides
8. Environmental analytical geochemistry
9. Modelling environmental systems: GIS platforms and data analysis
10. Perception and communication of environmental health risks and social inequality

Weblink: *http://9iseg.web.ua.pt* Contacts: *geo-9iseg@ua.pt*

2012 SINO-EUROPEAN SYMPOSIUM ON ENVIRONMENT AND HEALTH (SESEH 2012)
Galway, Ireland, Aug 20-25, 2012.
Now calling for abstracts. The aim of SESEH 2012 is to promote collaborations with China (大会宗旨：架设中国与世界沟通的桥梁).

The SESEH 2012 provides an internationally leading platform for the interaction between scientists, consultants and public servants engaged in the multi-disciplinary areas of environment and health. With fast economic growth, the importance of environment and health is widely recognized in China, and China welcomes international experts for collaboration. This symposium provides an opportunity for a direct communication between experts from China and the rest of the world, and helps to foster and develop international collaborations with China, the second largest economy in the world.

The conference venue is the campus of National University of Ireland, Galway, within walking distance of Galway's city centre. The conference is co-organized by GIS Centre, Ryan Institute of NUI Galway (*http://www.ryaninstitute.ie/facilities/gis-facility*), The Geographical Society of China (*www.gsc.org.cn*) and Environmental Sciences Association of Ireland (ISAI, *www.esaiweb.org*), supported by Ryan Institute of NUI Galway (*www.ryaninstitute.ie*), Society for Environmental Geochemistry and Health (SEGH, *www.segh.net*), International Medical Geology Association (IMGA, *www.medicalgeology.org*), Geographical Society of Ireland (*www.ucd.ie/gsi*), Ireland Chinese Association of Environment, Resources & Energy

(ICAERE, *www.icaere.ie*), National Centre for Geocomputation (*ncg.nuim.ie)*, South China Institute of Environmental Sciences (*http://www.scies.org/en*) and Chinese Environmental Scholars & Professionals Network (*http://www.cespn.net/english*).

SESEH 2012 Themes:

- Environmental sciences: chemistry, geochemistry, biogeochemistry, ecology and toxicology.
- Environmental pollution: air, water (river, lake, and marine), soil, and food.
- Environmental pollutants: metals and metalloids; persistent organic pollutants and pesticides.
- Environmental technologies: soil remediation; waste water treatment.
- Environmental management and monitoring: social impact assessment, economics and policies.
- Medical geology, endemic diseases, environmental health and public health.
- Links between environment and health, environment and genetic interaction.
- GIS and quantitative methods in environment and population health.
- Sustainable development and health: agriculture, industry, traffic, urbanization.
- Climate change and population health.

SESEH 2012 Keynote Speakers:

Professor Ming-Hung Wong (Ming-Hong Huang), Editor-in-chief: Environmental Geochemistry and Health
Professor Shu Tao, Member of Chinese Academy of Sciences
Professor Xiaoying Zheng, Peking University
Professor Derek Clements-Croome, University of Reading
Professor Jerome Nriagu, Editor-in-chief: Science of the Total Environment

SESEH 2012 Convenors and Topics for Organized Sessions:
(When submitting abstracts via the online system, ordinary delegates are required to choose the most appropriate general topic listed on the system. Invited delegates are required to choose the name of the corresponding session convenor (with a star) who has approved the abstract.)

Chen, Jianmin*; Yang, Xin; Mellouki, Wahid: Aerosol Chemistry and Health Impact
Clements-Croome, Derek*: Environmental Health in Buildings
Diamond, Dermot*: Sensor Networks for Distributed Environmental Monitoring
Sijun, Dong*: Environmental Molecular Toxicology
Clifford, Eoghan*; O'Reilly, Edmond: New sustainable technologies for decentralised wastewater …
Ding, Shiming*: Sediment pollution and remediation
Dogan, A. Umran*; Dogan, Meral: Medical Mineralogy
Belviso, Claudia; Fiore, Saverio*: Clays & Zeolites: Environmental & Medical Uses
Griffiths, Bryan*; Zhang, Bin: Land use and the soil environment
Healy, Mark G.*: Nutrients, soils and the environment
Kan, Haidong*; Song, Weimin: Climate change, air pollution and population health
Liu, Rutao*: Environment & Health on Molecular Level
Lucy, Frances*; de Waal, Theo: Searching for the Sources – Cryptosporidium in Ireland's Environment
Marsili, Enrico*; Erable, Benjamin: Electroactive biofilms
Marsili, Enrico*; Erable, Benjamin: Beyond electricity: Microbial Fuel Cells for bioremediation…
O' Donoghue, Lisa*; Leen, Joseph: WEEE and Battery Recycling
Peng, Xianzhi*: Pharmaceuticals and personal care products (PPCPs) in the environment
Qi, Shihua*: Organochlorined Pesticides Transportation
Quinn, Mary Kelly*: Land-use pressures on surface water quality, sources, pathways, impacts & mitigation

Sheehan, David*: New Frontiers of Omics Technologies in Environmental Science
Shen, Heqing*: Environment genetic/epigenetic interactions
Sodeau, John *: Impacts of Biological and Chemical Particulates in Air
Wang, Lin*; Chai, Fahe; Zhang, Renyi: Nucleation, Growth, and Aging of Atmospheric Aerosols
Xu, Xianli*: Soil threats
Zhao, Feng; Yu, Chang-Ping*: Innovative Technologies in Wastewater Treatment
Zhao, Yaqian*; Segura, Yolanda: Smart wastewater treatment approaches
Zhu, Duanwei*; Zhou, Yiyong: Environmental Chemistry and Recovery of Water Ecology

SESEH 2012 Workshops:
Medical Geology Short Course: Course leaders: Selinus, Olle; Finkelman, Robert; Centeno, Jose
Medical Mineralogy: Course leaders: Dogan, Meral; Dogan, A. Umran

You are welcome to Galway in Summer, 2012!

Chaosheng Zhang, Chair, SESEH 2012
Head, GIS Centre, Ryan Institute and School of Geography and Archaeology
National University of Ireland, Galway
IRELAND
Chaosheng.Zhang@nuigalway.ie

SESEH 2012 Sino-European Symposium on Environment and Health: *www.nuigalway.ie/seseh2012*

GEOMED 2013

The next IMGA conference will be in the Washington D.C. area in the fall of 2013. We fully expect that most of the top medical geologists from North America and the world will be in attendance as well as representatives from the U.S. EPA, NIH, CDC, WHO, World Bank, USAID, National Science Foundation, PAHO, etc.

The conference will afford young medical geology students the rare opportunity to hear, and to be heard, by the best. We anticipate that many students from around the world we be requesting financial assistance to attend this important meeting. Therefore, we are setting up a Student Travel Fund that will be used to defray the costs of attending the conference for deserving students.

We ask you to contribute to this worthwhile fund by sending your contributions by credit card on the IMGA website or by PayPal. 100% of your contributions will go to assist students in attending the conference and your name will appear in a conference brochure as a benefactor.

Sincerely, IMGA Management

GEOMED2015: 6th IMGA CONFERENCE

IMGA will open for bidding, according to the new policy book, at the beginning of 2012, following which a decision will be made on where GEOMED2015 will be held. To date, proposals have been received to hold the 6th IMGA Conference in Guiyang, China and in Aviero, Portugal.

BALNEOLOGY AND MEDICAL HYDROGEOLOGY OF THE NIGERIAN OIL FIELD'S

K'tso Nghargbu

SYNOPSIS OF PROJECT AND GOALS

This work seeks to answer the following question: Is formation water from the Niger Delta Oil Fields of any medicinal value? Oil production is expected to decline over time, hence the need to look for more sources of foreign exchange. Produced formation water, the third component of petroleum, promises to offer beneficial uses which must be explored. The goal is to underscore the chemistry of this (connate) water from the Niger delta and to suggest likely medicinal and or other benefits of it to humanity.

LOCATION, EXTENT AND ACCESIBILITY OF THE STUDY AREA

The Niger Delta is located within latitudes $4^{0}30^{'}$ - $5^{0}20^{'}$N and longitudes $3^{0}9^{'}$E. It occupies about 64,000 km^2 of the sedimentary basin of southern Nigeria. Accessibility to the area is only by air, sea, roads, streams and rivers as the entire delta is made up of a thick mesh of rain forest and mangrove swamps.

GEOLOGY OF THE STUDY AREA

Stratigraphy

The Niger Delta geology/stratigraphy is made up of sedimentary rocks of Eocene to Recent age. Three formations are prominent, the Benin (topset), Agbada, and the Akata (bottomset) Formations. This unique sand/shale deltaic complex with deposits of over 12km thickness towards the central part of the basin, is a rich petroleum province whose prospects continue to improve with further exploratory work. Its' unique structural features such as growth faults and roll over anticlines, offers structural/stratigraphic traps for the formed crude, making the Niger Delta a good hydrocarbon habitat.

There is as suggested Upper Eocene to Quaternary age for the Niger Delta sedimentary rocks, and also the Lower Turonian to Recent. Three sedimentation cycles gave rise to the Niger Delta sedimentary sequences, with the third beginning in the Eocene and continuing into the present day. It is during this third cycle that the modern Niger Delta was formed. Fig. 1 (next page) summarises the Niger Delta stratigraphy.

In 1964, the Geological Survey of Nigeria produced a comprehensive geological map of Nigeria at 1:2,000,000, which delineated the study area into six geological units represented in Fig. 2 (next page). The Benin Formation, the oldest unit passes below the Recent deltaic deposits of the Niger Delta and slopes gently seawards from an elevation of about 122m.

Hydrogeology

The Niger Delta area is a big host to groundwater. Its many sand and silt formations serve as aquifers for the groundwater.Three types are identified: meteoric (implying water in circulation in the geologic cycle derived from precipitation), connate (formation water, produced at the same time as the rock and constitutes a sort of fossil sea water) and ocean water. The classification is based on the evaluation of ratios of inherent components of bicarbonate, chloride and sulphate in the various water samples that were analyzed. A summary of the classification of the Niger Delta stratigraphy and hydrogeology is presented in Table 1 (page 50).

MEDICAL WATER OCCURRENCES IN NIGERIA

Prior to this work, occurrences of medicinal waters in Nigeria were mere speculations as indicated on Fig. 3 (page 50). The current project has answered the question as to the possibility of locating this geomedical resource in Nigeria within the Niger Delta Area.

MEDICINAL WATER EXPLORATION

Certain clues are helpful in locating medicinal waters. The most valuable clues include the following:

Geology of host rocks

The chemistry of groundwaters is a direct product of the chemical interaction with their host rocks. According to the site *www.hotmineralsprings.htm,* location and depth of the water source(s) are the basis for the elemental concentration of the waters. Certain rock or litho types are known to be great sources of pharmacodynamic elements. For example, most mineral waters in Greece appear in coastal terrain along the shoreline. Five sixths of the springs are by the sea. The definitive morphological configuration presented nowadays by Greece is a consequence of the great subsidence which occurred in the whole region. Within the tectonic fissures which also provoked the great subsidences, were created the condition for the formation of most curative mineral springs. These waters, which follow the orientation of tectonic fissures, because of the great depth from which they proceed are as a rule, hyperthermal with temperatures above 38^{0}C. The current towards the surface is swift and for this reason they do not

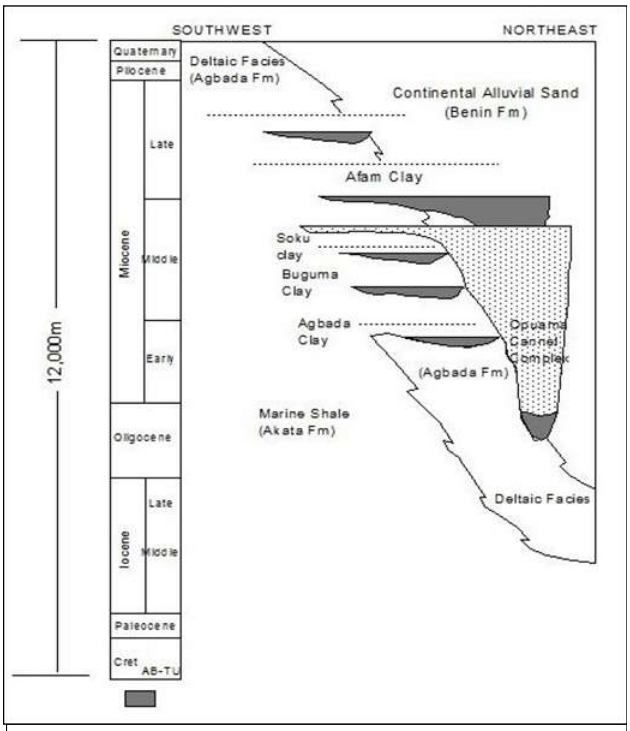

Fig. 1. Stratigraphic column showing the three formations of the Niger Delta.

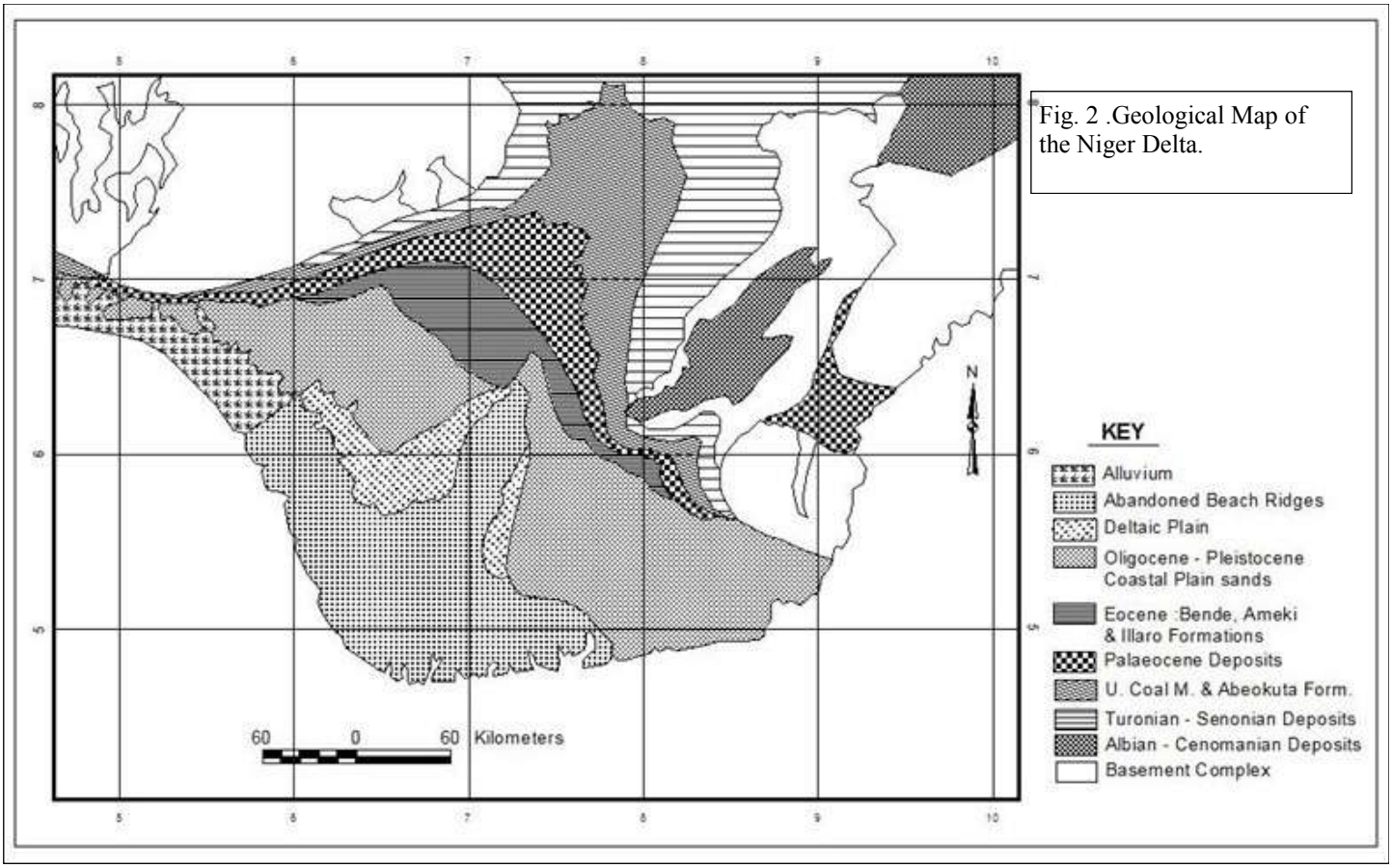

Fig. 2 .Geological Map of the Niger Delta.

Stratigraphic Sequence		Lithology	Hydrogeology
	QUATERNARY		
7	Alluvium	Sand, gravel, Silt, clay	Good
6	Meander belts, Swamps, Freshwater Swamps	Sand, gravel, clay, silt	Good
5	Mangrove swamps	Fine sand, silt	Poor (Salinewater)
4	Abandoned beach ridges	Sand gravel clay, silt	Medium
3	Sambreiro deltaic plain	Sand, clay, silt	Medium
	MIOCENE		
2	Benin Formation(Coastal Plain Sands)	Sand, Coarse sand with clay and shales	Prolific aquifer
	EOCENE		
1c	Ameki Formation	Clay, sand, shale	Good
1b	Ilaro Formation	Sand, Clay, Shale	
1a	Ogwashi Asaba Formation	Clay, sandstone Lignite and shale	

Table 1: Stratigraphic and Hydrogeologic Classification of the Niger Delta

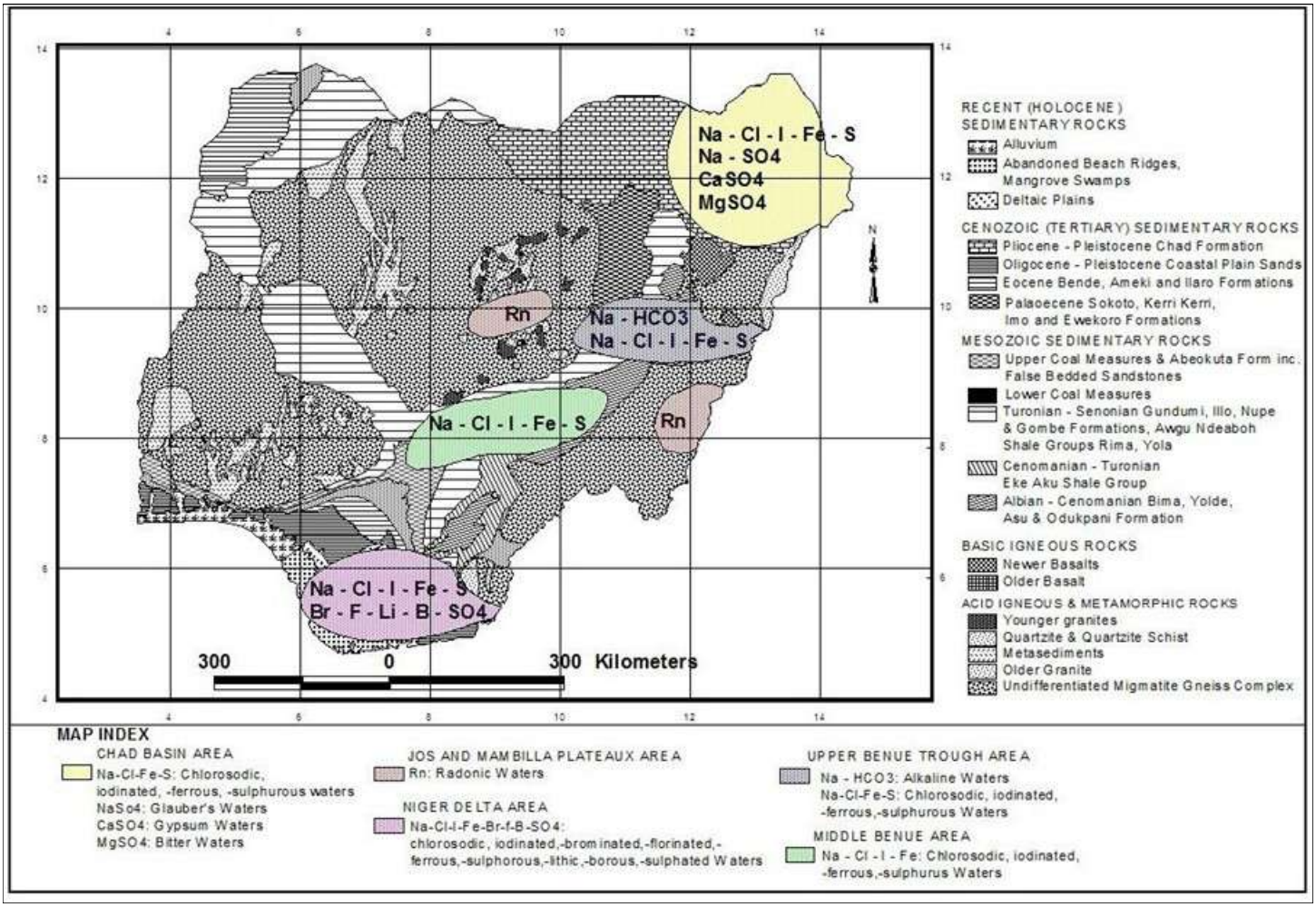

Fig. 3: Determined and Probable occurrence of medicinal waters in Nigeria

suffer great losses in their egress. Likewise, other mineral springs, like those of Milos and Santorini owe their existence to the presence of volcanoes which also characterise the area. The volcanicity in the region contributes to the enrichment of the waters and to the increase in their temperature.

Medicinal radioactive waters in Nigeria may be found among oligomineral waters of the Crystalline Hydrogeological Province, especially over deep rooted tectonic fractures systems. There is a probability of their occurrence as radonic hydrochemical positive anomalies in the crystalline belt of the Jos Plateau.

The Arkhyz, Karachaevo-Cherkessia, Teberda territory, in Russia owes its unique composition and ecologic purity to its origin. Its well is situated on a mountain slope at the height of 1,507meters. The bottom layers of the century-old glaciers of Northern Caucasia are melting and after coming through strata of the ancient Sarmat Miocene sea, the water is enhanced with the necessary salt and minerals according to *www.iugs.org*.

Correlation

In correlation, results from other known sources of medicinal waters, either within or without a particular geographic location, are compared. Where similar features of geology and hydrogeology exist, as compared to the existence of similar well known and established sources of healing waters elsewhere, an inference can be made as to the likely outcome of results from the location. Correlation has served as a very useful guide to the location of several economic mineral deposits of the world. For instance, Schoeneich (2001), in trying to establish the likely presence of carbogaseous waters in Nigeria, relied on correlative tools for his assertion. He noted that in Nigeria, carbogaseous waters had not yet been located. In the 80's while with the Plateau State Water Board, he searched for them in the Late Pliocene to Early Pleistocene volcanic areas of the Jos plateau, but without success. He still concluded that since in Germany, carbogaseous waters occur in areas of Miocene volcanism, there is still a possibility of finding them in volcanic areas of Nigeria, perhaps in Taraba and Adamawa States, along the Cameroun border.

Peculiar Properties of Medicinal Water.

According to *www.hotmineral springs.htm,* it is well known that man from ancient times applied spa therapy for curative purposes to waters whose temperature and chemical composition differed from ordinary waters. The characteristics of the curative springs of Icaria are as follows:

a. The increased temperature of the water.
b. Their much greater content of solid constituents in solution.
c. Their considerable content of rare or even pharmacologically efficacious constituents, such as radium, sulfur, sodium chloride, etc.

Among the constituents which enrich the springs are also included gases such as:

a. Oxygen
b. Carbon dioxide
c. Hydrogen sulphide
d. Radon
e. Nitrogen

The increased content of solid substances in solution, in the springs, is to a great extent due to the increased temperature which they possess and to the composition of the lithological subsoil of the area. Their enrichment in salts, in gases, as also in radioactive elements radium (radon), constitutes, with the high temperature, factors which add to the water's therapeutic properties, and so they are called "curative", *www.hotmineral springs.htm* continues, "The springs of Ikaria belong to the category of saltwater springs. They derive from waters which

issue from tectonic fissures and from a great depth. The radium enriches the waters of the spring since, while proceeding to the surface, they encounter and come into contact with rocks in which exist radioactive minerals, albeit in small quantities."

In the region of hot, radioactive mineral springs of Agios Kirykos there are hypothermal mineral-bearing deposits whose creation is connected with the grandiorite of the village of Xylosyrte. These deposits are limonites within the marbles of the region of Agios Kirykos and quartz veins with iron and copper pyrites. The possibility is not ruled out that otunite minerals might exist within the compacted outgrowths of the granodiorite of the village of Xylosyrte in the region of the curative springs of Thermae in Icaria. To the presence of these minerals is due also the radioactivity of the springs of Icaria. The springs of Thermae and Agios Kirykos occupy a special place worldwide amongst the remaining curative springs owing to their important and beneficial action in the constitution of radon.

As the temperature of the spring water increases, the gaseous radon increases, while the radium dissolved in the water diminishes. The radon enters the organism by being breathed into the lungs. A smaller percentage does so through swellings and perspiration, and finally this has a benign influence on the human psychism. Moreover with hyperthermal spas there is established an increase in sulphur, in radon, and in trace elements in the blood, in the bone marrow, the arthric cartilage, and the arthric fluid.

Radioactive elements like thorium and actinium, found in curative springs albeit in small quantity, exercise therapeutic action, chiefly on the lymphatic system, the glands and the blood. The lifespan of radon is very short. It is quickly expelled from the organism, 80% in the first hour after bathing through the lungs and exhalation. The remaining 20% is expelled in 24 hours through perspiration from the skin pores, as also by dieresis. Because of its rapid excretion from the organism there is no danger of accumulation in the human body.

SPA MEDICINE: Balneotherapy

Balneotherapy employs mineral waters, peloids, and gases as its' curing stimuli. Among the most important techniques used in health resorts therapy you can find the cure baths. The resources explored in these techniques are curing waters. These are the natural underground waters of proved curing properties, stable chemical composition and natural microbiologic purity: The curing capabilities of these waters are determined by the concentration and the kind of the biochemically active components in them. Poland for instance, has very rich curative water resources and the largest of the sodium chloride waters, carbonic acid mineral waters, sulphide-hydrogen sulfide waters, radon waters, and thermal waters are found there. They are applied as brine baths, carbonic acid mineral baths, accordingly as listed below:

Brine baths
Carbonic acid mineral waters
Sulphide-hydrogen baths
Radon baths.

The brine baths are used mainly in orthopedic and post traumatic conditions, as well as rheumatic, neurological, and gynecological ones.

Carbonic acid mineral waters bath helps in particular heart problems, hypertension, lower limbs ischemia, and in organ neurosis. There are two main types of these baths: the gas bath in carbon ioxide of natural or artificial origin and sulphide-hydrogen sulphide baths.

Sulphide-hydrogen sulphide baths are useful in the rheumatic diseases, orthopedic-post traumatic conditions, some dermatological ones, and in lower limbs ischemia.

Radon baths are the therapy for the peripheral circulation problems, upper breathing ways failures, rheumatic, and gynecological diseases.

BALNEOLOGICAL EVALUATION OF NIGER DELTA PRODUCED FORMATION WATER

The medicinal classification of the formation water from the Niger Delta is based on the revised German scheme after Schoeneich, 2001. Table 2 below indicates the hydro chemical composition of these waters, whose balneological quality is presented on Figures 4-7 (page 54).

GIG ID	Well ID	Well names / Co.	Co. Name	Location	Date of sam-	pH	Conductivity	Alkalinity	Hardness	Mineralization
2728/2007	K1	OLO	ELF	OML 58	11/09/2007	8	15000	51	59.6	7626
2729/2007	K2	OBAGI	ELF	OML 58	12/09/2007	8	13400	69	115	7793

Well ID	Ca	Mg	K	Na	Pb	Cu	Ni	Ag	Cd	Co	Li	Zn	B
K1	15.22	5.25	30.19	4069	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.01	0.47	0.04	26.5
K2	25.05	12.76	56.3	3862	< 0.01	< 0.01	< 0.01	< 0.01	< 0.002	< 0.01	0.33	0.035	14.5

Well ID	Cr	As	$N\text{-}NO_3$ (mgN/l)	$N\text{-}NO_2$ (mgN/l)	NO_3	NO_2	Br	I	F	Cl	$Cl+SO_4$	SO_4	HCO_3	CO_3
K1	< 0.01	< 0.03	< 0.1	< 0.006	< 0.5	< 0.02	25.8	8.52	2.44	4432	4480	47.7	3110	0
K2	< 0.01	< 0.03	< 0.1	< 0.006	< 0.5	< 0.02	18.7	8.72	3.65	3548	3552	4.03	4210	0

Table 2: Results of chemical analysis of formation water samples from the Niger Delta, Nigeria.
Notes: Except for pH and other listed parameters, all other values are in mg/l
Samples K1 (Olo) and K2 (Obagi) are aggregate waters from an average of 6 – 10 wells and 40 – 50 wells respectively.

SUMMARY AND CONCLUSION

The results of the analysis reveals that Nigeria's formation water and the good climate of the Niger Delta constitute a huge potential resource for balneotherapy in Nigeria.

Formation water from the oil fields in Nigeria, at least based on current work, could be useful for medicinal purposes. The abundant tepid, predominantly alkaline, chlorosodic, iodinated, brominated, fluorinated, lithic, borous, slightly sulphated waters can be used for balneotherapy. Common ailments treatable by these waters include those of gynaecological, dermatological, rheumatic, digestive tract, respiratory tract, and blood circulation.

For references see: *K'TSO NGHARGBU, 2011,* Balneology and Medical Hydrogeology of the Nigerian Oil Fields (See back page).

THE AUTHOR

Nghargbu K'tso is a young, enthusiastic researcher on Geo-medical Resources, currently pioneering Medical Geology research in Nigeria.

His works on medicinal waters within Nigeria and West Africa have distinguished him as a pace setter in this field. In the last year he has carried out research works in Senegal, Gambia, Sierra-leone, Liberia, Cote

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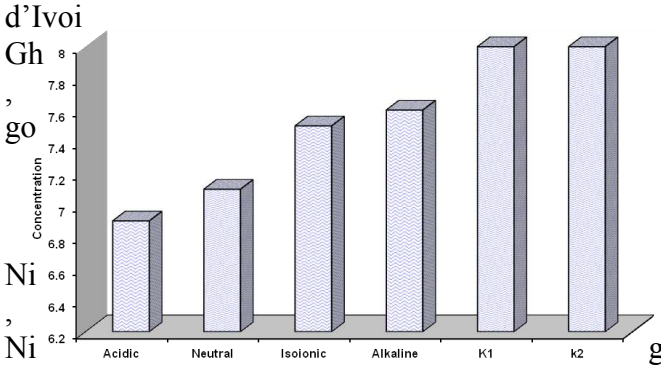

Figure 4. Classification based on pH
Acidic waters – pH<7.0
Neutral waters – 7.1-7.0
Isoionic waters – pH 7.5-7.2

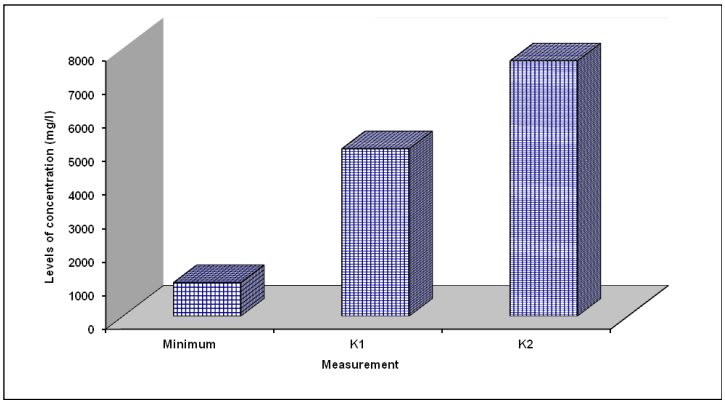

Figure 5. Classification bsed on mineralisation with standard (minimum)
Mineral waters: mineralisation of 1g/l or more
Oligomineral waters: mineralisation less than 1g/l

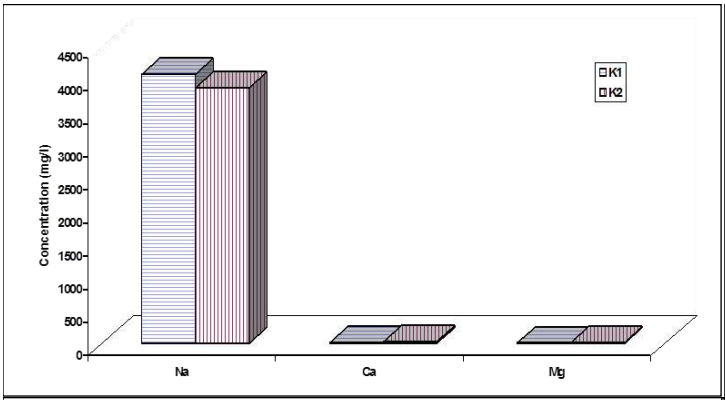

Figure 6a. Classification based on dominating mega ions.

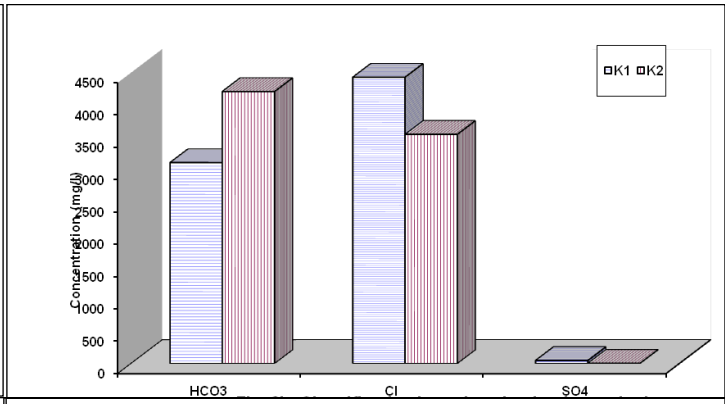

Figure 6b. Classification based on dominating major ions.

Dominating cation Meq/l	Dominating anion Milliequivalents per litre		
	HCO_3^-	Cl^-	SO_42^-
Na^+	Alkaline water	Chlorosodic water	Glauber's water
Ca^{++}	-	-	Gypsum water
Mg^{++}	Alkaline earthy water	Chloro-magnesium water	Bitter water

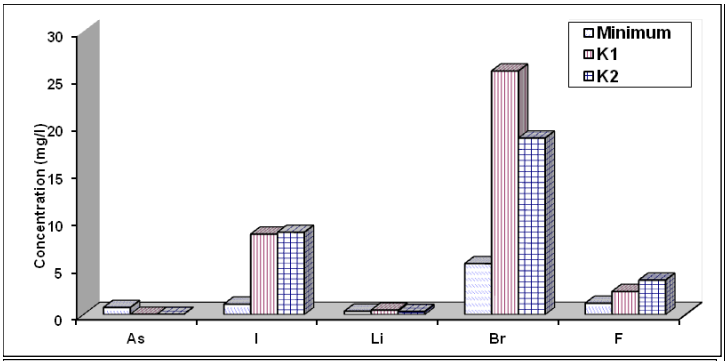

Figure 7. Classification based on pharmacodynamic elements

Element	Minimum conc. in mg/l	Name of water
Fe	>10	Ferruginous water
As	>0.7	Arsenical water
I	>1	Iodinated water
Li	>0.3	Lithic water
Co_2	>1000	Carbogaseous water
S	1	Sulphurous water
Rn	30ncl	Radonic water
Br	>5	Brominated water
H_2Sio_3 metasilicic acid	>100	Siliceous water
F	>1	Fluorinated water
H_2Bo_2 metaboric acid	>5	Boric water

a.

He is the Author of the book "Balneology and Medical Hydrogeology of the Nigerian Oil Fields" as well as author of articles in Acta Balneologica, amidst other journals.

His most recent Academic Award came in September 2011, in Italy at the 4th International Medical Geology conference. Others include NMGS/MOBIL PRIZE, and the NAPE/VERITAS DGC/ASH BERT AWARDS. Mr. Nghargbu is also a recipient of several grants, common among which are the ETF Training Grant, the Nigeria Sao-Tome and Principe Joint Development Authority Grant, ASUU Research Grant, and most recently the UNESCO -Poland fellowship

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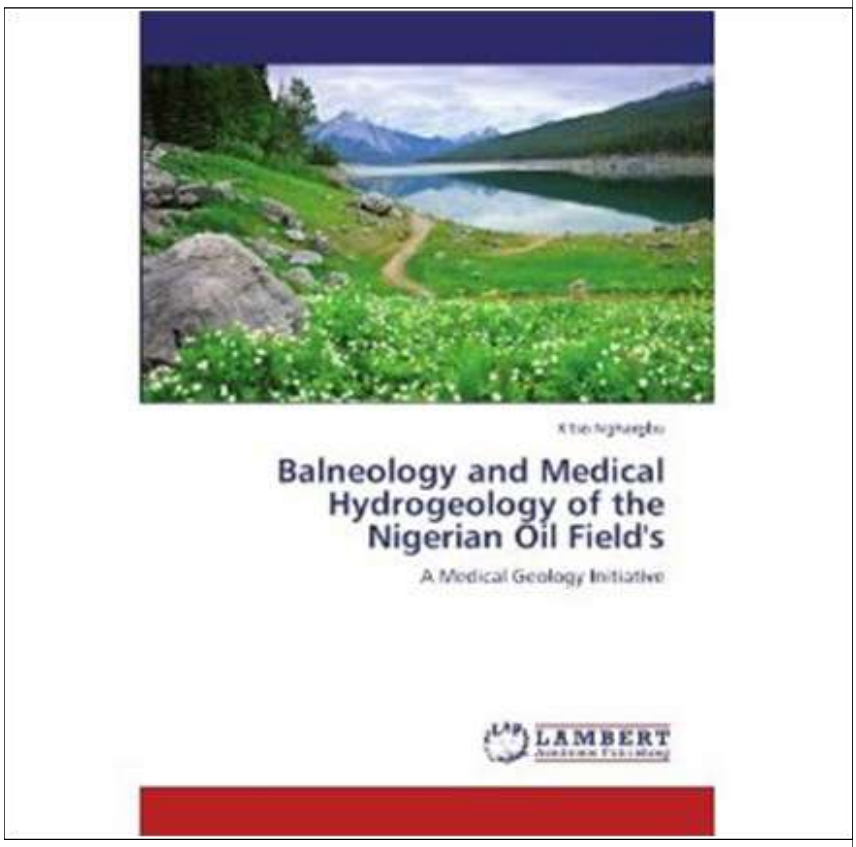
Editorial policy was published in Newsletter 17 and can also be found and in the Policy Book on the IMGA website.

Readers should note that this is not a refereed journal and that the contents of articles do not necessarily represent the opinions of, or are supported by, IMGA.

BOOKS

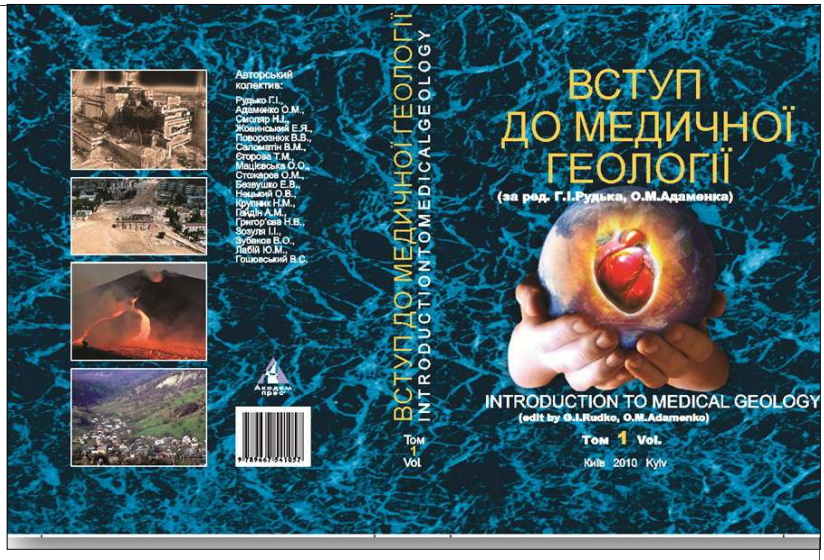
BALNEOLOGY AND MEDICAL HYDROGEOLOGY OF THE NIGERIAN OIL FIELD'S



A Medical Geology initiative inspired by an M.Sc project carried out by the author at the Ahmadu Bello University, Zaria in Nigeria. It was novel in concept and revolutionary in its' ideas. The content ranges from a simple review of the geology of the Niger Delta oil field's of Nigeria, to the classification of their formation waters based on balneo-chemistry. The book also dealt with the subject of balneology and physical medicine based on established procedures and norms. In addition, a brief economic sample study of the beneficial exploitation as well as application of mineralised oil field waters in health care delivery was also established.

The rarity of literature related to balneology and balneological resources in English makes this 100 page book a valuable companion for scholars interested in this subject. Furthermore, its' bifocal content (Medicine and Geology) is certainly a lead

INTRODUCTION TO MEDICAL GEOLOGY



At the 1st International scientific conference on Actual problems of modern geology, geography and geochemistry held at the Brest State University (BrGU), Republic of Belarus in 2011 (see Events section), Ukranian scientist Georgy Rud'ko presented a book, Vstup Do Medichnoi Geologii (Introduction to Medical Geology), in Ukrainian, published in Kyiv in 2010. This is a two volume edition written by a collective of Ukrainian authors.