Dear friends and colleagues: On behalf of our Executive Committee, I am very pleased to introduce our 27th edition of the International Medical Geology Association Newsletter and its first 2016 edition. IMGA Newsletters and e-news are our principal mode of informing you, about all the activities that our colleagues are performing worldwide on the latest advances on Medical Geology education, research and meetings. In addition, I would like to encourage you to visit our website and Facebook pages aimed at communicating and keeping you informed of the day-to-day activities of our Association. This year the Executive Committee has been working on several logistical and management changes in order to consolidate IMGA and to secure the future of our Association as we continue improving the benefits to our members worldwide. On this regard, I would like to express my most sincere gratitude to all our members, friends, colleagues and volunteers who have being actively working for modifying and strengthening the future of IMGA.

Please note the announcement of our next 7th International Conference on Medical Geology “MedGeo2017” to be held in Moscow, Russia, August 28 – September 1, 2017. We are grateful to the chapter’s leader, Dr. Iosif Volfson and the Local Organizing Committee for the outstanding organization of our main international event. I would like to ask each one of our IMGA Chapters, to promote this conference amongst its members and regions. Finally, I want to thank Dr. Mark Cave, our IMGA Editor-in-chief, for all his work editing this publication with great dedication and commitment. Enjoy this IMGA Newsletter Nº 26 edition.

Sincerely Yours,

Prof. Dr. Nelly Mañay, Chairperson, International Medical Geology Association

“In the end, it's not the years in your life that count. It's the life in your years.” - Abraham Lincoln
NOTE FROM THE EDITOR

Dear IMGA members, I would like to welcome you to the first IMGA newsletter of 2016. The quotation I have chosen is a reflection on the sad loss of Professor Jane Plant, whose work on the relationship of the environment to human and animal health was fundamental to the establishment of the Medical Geology discipline we know today. The obituary for Professor Plant, as it appeared on the British Geological Survey website, has been reproduced in this newsletter.

There are two short contributed articles in this newsletter: the first from Cassio Roberto da Silva, who outlines the environmental impact of from a mine tailings dam failure in Brazil; and the second is a short note from me on the distribution of iodine in the soils of London. Please keep your articles coming in.

A number of six monthly reports on the activities of local chapters are included; those chapters not reporting in this newsletter will be included in the next issue.

I would also like to draw your attention to a number of thought-provoking, recently published papers and Bob Finkelman provides us with a review on an interesting book on “Minerals and Human Health”. I have also highlighted a number of Medical Geology Related conferences that are coming up between July and September this year as well as reminding you of the MedGeol conference in Russia in 2017.

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CONTRIBUTED ARTICLES

Preliminary assessment of the environmental impact health caused by the breach of iron mining dam in Mariana-Minas Gerais, Brazil

Cassio Roberto da Silva, cassio.silva@cprm.gov.br
Fernanda Gonçalves Cunha, Fernanda.cunha@cprm.gov.br
Eduardo Paim Viglio, Eduardo.viglio@cprm.gov.br
CPRM-Geological Survey of Brazil

INTRODUCTION

On November 5 of 2015, the worst environmental mining disaster in Brazil occurred. It was the result of the collapse of the Fundão tailings dam (Samarco mining company, controlled by BHP Billiton Ltd and Brazil Vale SA), located in the municipality of Mariana, Minas Gerais. About 34 million cubic meters of mud from Fe mining were released, affecting 663 km on the Doce river and its tributaries. It was estimated that approximately 80% of these materials were dispersed along 110 km of the North Gualaxo rivers and Carmo rivers and their tributaries before reaching the Doce river and have reached the sea after 16 days. This disaster caused the death of 18 people (1 still missing) and the total devastation of the Bento Rodrigues district, which had 600 people living in it.

Figure 1. Google images after the disaster: a) the North Gualaxo river with upstream dams of Fundão and Santarém; b) the North Gualaxo river with the sealed margins; c) the join of the North Gualaxo river and the Carmo river; d) the Doce river flowing into the sea showing the discharge of sludge to
the Atlantic Ocean 16 days after of the dam disruption (photo Ricardo Moraes / Reuters on November 23, 2015).

The tailings formed a wave of mud (fluvial tsunami), it reached a height of 5.5 m that followed the normal and the backflow of water, which caused the clogging and filling of the riverbeds and riverbanks of the North Gualaxo, Carmo and Piranga rivers. The wave of mud reached the Carmo river 4 km upstream. The tailings mud varied in thickness along 80 km of the North Gualaxo river: up to 10 m until Bento Rodrigues district, 6 m in the middle course and 4 m at the confluence with the Carmo river. The North Gualaxo and the Carmo rivers riverbanks were covered with mud to a width of 200 m and 50 m, respectively (Figure 1).

The Fe ores are mainly composed of hematite (Fe2O3), magnetite (Fe3O4), goethite (FeOOH), siderite (FeCO3), pyrite (FeS2) and ilmenite (FeTiO3) (Duarte 2015). In the case of the Iron Quadrangle in Minas Gerais, the Samarco mining company explored Banded Iron Formations (BIF) ores, which consist in finely interstratified bands of sediments and metasediments with cryptocrystalline quartz (chert). The lithology in this area is called Itabirito, consisting of chert, bands of granular recrystallized quartz with hematite and magnetite, but also occurring goethite and martite (pseudomorph of hematite). The tailings from the Samarco mine are mainly composed of silica, goethite, hematite and kaolinite (PIRES et al., 2003). The mud contains more than 50% goethite. It is mostly composed of inert material, such silica and some oxidized metals, with low levels of Cd, Cr, Mn and Pb.

RESULTS

As had been requested by the Federal Government, the Geological Survey of Brazil (CPRM) in conjunction with the National Water Agency (ANA), executed a preliminary assessment and monitoring study of the impacts caused by the Fundão dam wastes, through the North Gualaxo and the Carmo rivers and their tributaries. Geochemical and physicochemical analysis of waters and sediments of these rivers were carried out.

A sampling campaign (25 water and sediment samples were collected - Figure 2), conducted by CPRM in Doce river Basin (November 2015), pointed out that the mud coming from the disruption of the Fundão dam contained mainly iron-silicon inert materials (Cunha et al. 2015). The measurements of physical and chemical parameters of water taken in 2015, showed significant differences for the dissolved oxygen (DO) and electric conductivity (EC) in relation to those obtained in 2010. The DO decreased by approximately 3 mg/L. In general, DO values measured in 2010 are in accordance with the threshold set by CONAMA 357/2005 (none less than 5 mg/L), whereas in 2015, most are less than 5 mg/L. The EC increased on average by 150 µS/cm. This variation observed for DO and EC is due to the presence of sludge coming from the Fundão dam, which also caused high turbidity (120,000 NTU) for several days, resulting in the death of 5 tons of fish in the Doce River. This turbidity peaked on 07/11/15 with 419 mg/L of suspended solids in Cachoeira do Óculos locality, about 130 km from the ruptured dam, reducing to 2.0 mg/L on 19/11/2015 in Colatina-ES, close to the Doce river mouth (discharging to the Atlantic Ocean). The pH values remained constant in both years.
The analytical results of the dissolved anions in the water samples, that were collected in 2015, showed values ranging from 0.31 to 9.21 mg/L for chloride; 0.01 to 0.33 mg/L for fluoride; 0.01 to 8.22 mg/L for nitrites; 0.06 to 11.85 mg/L for nitrates; 0.12 to 200.48 mg/L for sulfates; and <0.05 mg/L for phosphates. No significant changes for anions were observed in samples collected in 2010 and 2015. In terms of environmental health no risk was identified.

In 2015, high Mn concentrations (above the 0.100 mg/L reference limit established by CONAMA 357/2005) were found in 5 water samples from area A (values ranging from 0.118 to 0.576 mg/L - Table 1). In the drainage system around Santarem dam the Mn contents were found ranging from 0.323 to 0.760 mg/L in 5 samples and Al 0.125 to 0.489 mg/L in 8 samples (above the reference value of 0.100 mg/L - CONAMA 357/2005). Also Fe values ranging from 0.339 to 0.501 mg/L (above the reference value of 0.300 mg/L - CONAMA 357/2005) were found in this area. Most of these high levels, with the exception of Fe, were not found in the 2010 campaign.

Table 1 shows the results of Mn, Fe, Al in water samples, and Cr, Fe and Mn in sediment samples (2010 and 2015) for 3 different areas: (A) From Santarém Dam to Doce river mouth; (B) surrounding the Santarém dam; and (C) area not affected by the mud wave.

The bottom sediment contents in 2015 increased significantly compared to 2010 (Table 1). The Mn concentrations of 7 samples (A and B areas) ranged from 772 to 2916 mg/kg. Five samples collected in area C showed As concentration ranging between 24 to 313 mg/kg (above 17 mg/kg limit established.
by CONAMA 454/2012). Due to the location of the samples collected in the Doce river (from Rio Doce city up to Linhares, Figure 2), these levels are not related to mud waste.

Table 1. Concentrations of some potentially harmful elements in water and sediment samples, collected in 2010 and 2015 in 3 different areas: (A) From Santarém dam to Doce river mouth; (B) surrounding the Santarém dam; and (C) area not affected by the mud wave.

<table>
<thead>
<tr>
<th></th>
<th>Water - 2010</th>
<th>Water - 2015</th>
<th>Sediment - 2010</th>
<th>Sediment - 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Al</td>
<td>Fe</td>
<td>Mn</td>
<td>Al</td>
</tr>
<tr>
<td>Galvezão</td>
<td>&lt;0.01</td>
<td>0.012</td>
<td>0.501</td>
<td>0.016</td>
</tr>
<tr>
<td>Barra Longa</td>
<td>0.069</td>
<td>0.377</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Rio Doce</td>
<td>0.045</td>
<td>1.4</td>
<td>0.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Fazenda Cachoeira D'Anta</td>
<td>0.008</td>
<td>0.400</td>
<td>0.156</td>
<td>0.008</td>
</tr>
<tr>
<td>Cachoeira dos Boucas</td>
<td>0.029</td>
<td>0.286</td>
<td>0.04</td>
<td>0.039</td>
</tr>
<tr>
<td>Ponte Rodovia Pinha</td>
<td>0.009</td>
<td>0.315</td>
<td>0.04</td>
<td>0.040</td>
</tr>
<tr>
<td>Peixoto</td>
<td>0.018</td>
<td>0.207</td>
<td>0.04</td>
<td>0.042</td>
</tr>
<tr>
<td>Governador Valadares</td>
<td>0.002</td>
<td>0.113</td>
<td>0.04</td>
<td>0.032</td>
</tr>
<tr>
<td>Turnaúna</td>
<td>0.008</td>
<td>0.074</td>
<td>0.04</td>
<td>0.035</td>
</tr>
<tr>
<td>Córrego do Peixe</td>
<td>0.013</td>
<td>0.001</td>
<td>0.04</td>
<td>0.037</td>
</tr>
<tr>
<td>Baixo Guandu</td>
<td>0.012</td>
<td>0.001</td>
<td>0.04</td>
<td>0.125</td>
</tr>
<tr>
<td>Colatina</td>
<td>-0.05</td>
<td>0.128</td>
<td>0.094</td>
<td>-0.05</td>
</tr>
<tr>
<td>Linhares</td>
<td>&lt;0.01</td>
<td>0.012</td>
<td>0.013</td>
<td>235</td>
</tr>
</tbody>
</table>

The Fe values also increased compared to 2010, with levels of 13 samples above the median of 15%, which is related to the tailing mud and also to the tributary of the Doce river. The Cr in 2 samples showed values ranging of 103 and 113 mg/kg, above the limit of 90 mg/kg defined by CONAMA 454/2012, located in the Doce river in Governador Valadares and around the Santarém dam, respectively.

Six sediment samples (Figure 2 detail area - B) collected in 2015, in the basin of North Gualaxo river (Figure 1a, b and c), which are composed entirely of waste, did not show metal contents above the CONAMA 454/2012 thresholds. These samples consist mainly of high Fe content (> 15%) and low concentrations of Mn (300 mg/kg).
CONCLUSION

In terms of environmental health, the results of harmful metals in waters and bottom sediments collected in 2010 and 2015 allow us to conclude that:

Significant amounts of Mn and Fe were dissolved in the water, mainly related to mining tailings material widespread along the Doce river. Surrounding the Santarém dam, Al and Mn are 2.5 and 7 times higher, respectively, than the reference limit values (CONAMA 357/ 2005).

In the bottom sediments, Mn and Fe are also associated with mining waste, with values 4 times higher than the median value. In 2010 As and Cr were detected in these samples, probably derived from other mines operating in the region, or even from natural sources. Also Fe and Mn occur at high concentrations in these samples.

These data also suggested that the impact of mud tailings in the environmental was mostly physical (increase of turbidity and low clogging of the riverbanks and riverbed), and the reduction of DO in the North Gualaxo and the Carmo rivers. In the Doce river the mud laid on the riverbed, nearby Governador Valadares city, without affecting their margins.

These results require continuous monitoring studies by the Health and Environmental authorities. More investigations are needed to understand the impact of these metals on the population health and on the environment. There is an urgent need for the local population to be informed about the probable risks from contaminated water, soil ingestion, and through the food chain. In addition, the other sources of metals in these rivers should be investigated.

REFERENCES


Iodine in the soils of London, England – A short note

Mark Cave, British Geological Survey UK mrca@bgs.ac.uk

Iodine is an element that has been much studied in the field of Medical Geology because of its influence on human health [1]. Iodine is essential to many life forms, including humans, and is found in thyroid hormones. A lack of iodine in the body will result in a condition known as a goiter, where the thyroid gland in the neck becomes enlarged. Iodine deficiency during fetal development and in the first year of life can result in endemic cretinism, a disease which causes stunted growth and general development along with brain damage. The distribution and geochemistry of iodine in the environment has recently been reviewed [2] but there is little detailed information on the concentration of iodine in urban environments.

Iodine in London Soils

London Earth is the systematic high-density geochemical soil survey of the Greater London Area aiming to give insight into the environmental impacts of urbanisation and industrialisation as well as to characterise the geochemical baseline of the UK's most populous city. Soil sampling campaigns were carried out from 2005 to 2009, analyses were completed in 2010. The links between the controls on soil geochemistry and the underlying geology have been reported [4]. Amongst the 50 elements

Figure 1 Iodine distribution in London soils
analysed by X-ray Fluorescence analysis was iodine. Figure 1 shows an interpolated map of the iodine concentration in the soils colour coded to the percentiles of iodine concentrations found in the samples which ranged from ca. 0.1 to 65 mg/kg with an approximate log normal distribution. In the south of London there is a clearly elevated region over the chalk bedrock which associated with the marine origin of chalk. The other elevated region is to the east of London on the banks of the river Thames and is likely to be derived from spray from the saline intertidal waters from the river. Over the rest of London, iodine distribution is less well delineated suggesting that anthropogenic activity may be the main control. Residents of London are unlikely to obtain their iodine intake from the soils of London and therefore iodine in soil is probably not important factor in their health, nevertheless, it is interesting to see the range and spatial distribution of this less commonly determined element in an urban environment.

References


3 http://www.bgs.ac.uk/gbase/londonearth.html (accessed 31/05/2016)


CHAPTER REPORTS

The following reports cover the period of January 2016 to April 2016.

Brazil

Chapter Leaders : Bernardino Figueiredo and Cássio Silva

Period: 2016 – 1st term

During this term Dr. Cássio Silva was invited to join Prof. Ari Roisemberg to chair the technical session “Environmental and Medical Geology” during the 48th Brazilian Geological Congress to be held next October (9th - 13th) in Porto Alegre, South Brazil (http://www.48cbg.com.br/).

Some Medical Geology activities have been included in the program of the XIII Geochemical Congress of the Portuguese Speaking Countries to be held in the Fortaleza city, Northeastern Brazil, next November (14th – 18th). More specifically, a short course on Medical Geology will be conducted by Bernardino Figueiredo and Cássio Silva who will also organize a business meeting of the Brazil Chapter in connection with that congress.
Profesor Bernardino Figueiredo was invited to participate of the XIII Student Week of Environmental Engineering at the University of São Paulo in the São Carlos city. A lecture entitled “Lead, arsenic and mercury in the environment and effects on human health” is scheduled to May, 16th.

The Brazil Chapter members, Cassio Silva, Fernanda Cunha and Eduardo Viglio, geologists of the CPRM-Geological Survey of Brazil, have submitted a manuscript entitled “Preliminary assessment of the environmental health impact caused by the breach of the iron mining dam in Mariana, State of Minas Gerais, Brazil” as a contribution to this issue of IMGA Newsletter.

**Colombia**

Chapter Leader: Ana María Rojas Bernal

Chapter members: Sandra Carolina Londoño, Nívea Cristina Garzón, Nancy Carolina Tenjo, Jose Alberto Tinoco

The Colombian chapter has been working on the following topics:

- Literacy in Medical and Forensic Geology. We continue to work on English and Spanish documents. They include big ideas and theoretical principles of these disciplines. We are including geoforensic and geo-ethics topics in both documents.

- The formulation of two ideas for start of the process to apply for royalties resources: “Diagnosis of the socio-environmental and geo-epidemiological situation in Colombia.” and “Study and implementation of a prototype restoration and management of buffer zones of hydrocarbon transportation system in Colombia.”

- A document about the methodology for Medical Geology Studies. This document compiles the different sample procedures used in Environmental Geochemical and Public Health. We are including the topic on environmental indicators and a methodological proposal for a link to medical and forensic geology.

- A directory of strategic partners to promote and develop Medical Geology in Colombia.

- We are expanding the network in Colombia, the chapter is part of The network of American Young support environmental projects, the International Association for Promoting Geoethics (IAPG) and the workgroup and support of Geoethics and wellness of National University.

- Our chapter member Sandra Carolina Londoño has finished her PhD in geological sciences the School of Earth and Space Exploration at Arizona State University, in Tempe, AZ.
Nigeria

Chapter Leader: Dr. A. S. Olatunji

6-month highlights summary for the IMGA Newsletter:

The Nigeria Chapter was officially recognised in October, 2015 at the IMGA Board meeting held at Geomed 2015 in Alveiro Portugal and subsequently issued with a certificate.

The Chapter has been involved in mobilising prospective members to sort out their registrations with IMGA by paying the necessary dues online.

The Chapter was a co-convener of the session on Medical and Environmental Geology with the sub-theme “Urbanization and Environmental Waste Management and Sustainability” at the 52nd International Conference of the Nigerian Mining and Geosciences Society (NMGS) held in Ilorin, Kwara State Nigeria between 13 – 18 March, 2016. At this session, 15 papers were presented with Seventy (70) people in attendance. The Session was very educational and informative with sound academic interactions among the participants.

As a follow-up, a meeting of the Chapter was held after the session at the same venue to draw up a road map for the Nigeria IMGA Chapter. Members were encouraged to complete their registration formalities online with the payment of all dues. It was also agreed that another meeting would be convened in June, 2016 to further develop the strategy for the planned Session on Medical Geology in the forthcoming 26th Colloquium of African Geology (CAG26) of the Geological Society of Africa (GSAf) being hosted in Nigeria in November 2016.

As a fall-out from the meeting, a mailing list for all the members and intending members was created in order to follow-up on the registration status as well as exchange ideas in the field.

The Nigerian Chapter of IMGA will be working actively with colleagues from other parts of the continent in organising a very robust Medical Geology Session at the 26th CAG in November, 2016 at Ibadan, Nigeria.

Sweden

Chapter Leader: Robert Wålinder (succeeding former chapter leader Olle Selinus. from December 1st 2015)

Network structure and aim

The formalities of chapter administration are diminished to a more minimalistic network with Robert Wålinder as the network administrator. We are open for initiatives such as discussions, announcements of new books and articles, meetings or other professional exchange.
Six months summary

December 2015: An offer from former chapter leader Olle Selinus who is selling his book, "Medicinsk Geologi" [In Swedish] from the publisher Studentlitteratur 2010. Order from this booksite: http://www.bokborsen.se/. The price is "up to 1.50 Skr". If you are a teacher or arranging courses dealing with medical geology You might get samples free. Contact Olle Selinus or the chapter leader.


Spring 2016: The University of Uppsala gave a course in Medical Geology worth 10 credits. Several chapter members are lecturers, and Ulf Lindh is course director. See the URL http://www.uu.se/en/admissions/master/selma/Kurser/?kKod=1BG426&typ=1

UK

Chapter Leader: Dr Darren Beriro

The UK IMGA has been promoting IMGA where possible. In particular the current Chair, Darren Beriro was invited to give an evening presentation at the Cambridgeshire Geological Club on 14th March where he spoke on the subject. Other related activities include a seminar hosted by British Geological Survey on current issues in contaminated land and also an invited presentation at national conference on Innovation in Site Investigation. Both of which included a presentation by Mark Cave on the human bioaccessibility of harmful chemical elements and organic compounds in soil.

Dr Mark Cave presenting a talk on bioaccessibility of harmful chemical elements and organic compounds in soil at the British Geological Survey in May 2016
OBITUARY

Professor Jane Plant CBE 1945-2016

It is with great sadness that we report that Jane passed away on Friday 4th March 2016. She will be remembered vividly by many of her former colleagues at BGS as well as by former research collaborators and students across the world. A geochemist of high international standing and a leader in her field, Jane made a lasting impression on those who had the privilege of working with her – her passion, drive, creativity and pursuit of meaningful impact in her research were exceptional. Reflecting on Jane's work as a BGS scientist, it is easy to see that she left a substantial legacy – a high resolution baseline geochemical dataset with many applications of economic, environmental and social benefit for the UK and methods that have been adopted and adapted around the globe as standard for undertaking geochemical surveys. Further, Jane developed strong and prolific research outputs in metallogenesis, crustal evolution and environment and health; In the latter she was the initiator of what continues to be a significant area of research for BGS. Her scientific reputation was recognised throughout her career by numerous prestigious awards, honorary professorships and memberships of learned society, governmental and parliamentary committees.

Jane's legacy extended beyond her scientific outputs – her leadership, with a firm commitment to creating and supporting opportunities for the development and progression of early-career scientists also made a lasting impact; she made exceptional career progress becoming one of the nation’s most senior female scientists in an era when leading female scientists were rare and faced many barriers to progression. As a result of her experiences she became a role model and champion to many younger scientists.

Jane retired from BGS in 2005 when she held the role of Chief Scientist but her career continued to gather momentum in other directions, commencing in 2003, with publication of 'Your life in your hands', the first of a series of books she wrote on the relationship between diet and health. After leaving BGS, Jane held the position of Emeritus Professor of Geochemistry at Imperial College until her death.

Biography

Jane attended Ashby de la Zouch Grammar School for Girls and joined BGS in 1967, aged 23, with a first-class degree in Geology from the University of Liverpool and was assigned to the Atomic Energy Section in London under Stan Bowie. Her career progressed rapidly; initially developing methods in the north of Scotland for a regional geochemical Survey to identify resources of economically important metals for which she was awarded, in 1977, a PhD from the university of Leicester for her work "Regional Geochemical mapping in Great Britain with particular reference to sources of error".
By 1983 Jane had achieved Band three Individual Merit Promotion in recognition of her scientific achievement. Following a sabbatical year in 1988-89, spent in Northern Canada developing her skills and experience working as Vice-President of a junior exploration company, she moved from London to Keyworth as all BGS Geochemistry operations relocated. Subsequently, Jane held a succession of senior leadership positions in BGS culminating in 2002 with her appointment as BGS Chief Scientist.

In 1997 Jane was awarded a CBE in the Queen’s Birthday Honours list in recognition of her contribution to science and industry.

*This is the obituary published by the British Geological Survey on their website ([http://www.bgs.ac.uk/news/item.cfm?id=7318](http://www.bgs.ac.uk/news/item.cfm?id=7318)). The Times newspaper also published an article on Jane ([http://www.thetimes.co.uk/tto/opinion/obituaries/article4720101.ece](http://www.thetimes.co.uk/tto/opinion/obituaries/article4720101.ece)).*

**BOOK REVIEW**

**Minerals & Human Health**

by Larissa Dobrzhinetskaya


Paper: $42.95  Digital: $38.95

For disciplines such as Medical Geology to remain vital and dynamic they must regularly attract new adherents. For some, recognition of local medical geology issues instills a desire to learn more. For others, taking a class from an inspiring professor, or hearing a talk from a visiting lecturer or a speaker at a scientific conference generates interest in the topic. Of those interested in medical geology an important segment was introduced to the subject through access to one of the many good books that have appeared during the past decade. For a decent survey of current books on Medical Geology visit: [http://www.medicalgeology.org/pages/public/publications/page_Publications.htm](http://www.medicalgeology.org/pages/public/publications/page_Publications.htm). For the most part, the primary target audiences of these books have been professional scientists and graduate students. Now, however, an excellent book on Medical Geology is available that would appeal to undergraduates, non-scientists, and even curious high school students.

In Minerals & Human Health Larissa Dobrzhinetskaya weaves an easy to read, comprehensive overview of medical geology issues with useful introductions to geology, chemistry, mineralogy, and pathophysiology. There are chapters on geologic processes, minerals, medical geology, asbestos, coal, and several chapters on geologic and anthropogenic hazards. Each chapter is followed by several
pages of incisive questions and quizzes presenting students with an excellent opportunity to test their retention of the subject matter. All of the major medical geology issues are covered including the health impacts of ambient and intercontinental dust, volcanic emissions, earthquakes, Valley Fever, geophagy, asbestos, coal, and the usual suspects – arsenic, lead, mercury, selenium, fluorine and other potentially hazardous elements.

The book cover indicates that this is the ‘First Edition.’ For the Second Edition, I would offer a few suggestions. The title is a bit misleading in that the book covers far more than just the health impacts of minerals. The book is profusely illustrated but the quality of the paper could be better. The most disappointing aspect of the book is the absence of an index. This is unfortunate, especially for those interested, for example, in the health impacts of arsenic that is covered in at least half a dozen different sections.

Despite these minor shortcomings Minerals & Human Health fills a much needed gap in our library. In the right hands this book could stimulate early interest in, and attract many new adherents to, Medical Geology. I recommend this book to anyone who is interested in a readable description of how the natural environment can impact human health. Instructors may request a complimentary digital review copy through the publisher’s website: https://titles.cognella.com/minerals-and-human-health-9781626613423.html.

Robert B. Finkelman

**RECENT PUBLICATIONS**

Medical Geology: Impacts of the Natural Environment on Public Health Edited by Jose A. Centeno, Robert B. Finkelman and Olle Selinus Special Issue Published in Geosciences - A reprint of the 2014 Geosciences special issue is now available for download as a 258-page PDF at http://www.mdpi.com/books/pdfview/book/182.


UPCOMING MEETINGS

32nd INTERNATIONAL CONFERENCE ON ENVIRONMENTAL GEOCHEMISTRY AND HEALTH 4th-8th July 2016 Brussels, Belgium

ISEH 2016, ISEG 2016 & Geoinformatics 2016
Joint International Conference on Environment, Health, GIS and Agriculture
Galway, Ireland, August 14 - 20, 2016

Welcome to the website of Joint International Conference on Environment, Health, GIS and Agriculture
ISEH 2016: The 3rd International Symposium on Environmental and Health
ISEG 2016: The 10th International Symposium on Environmental Geochemistry
Geoinformatics 2016: The 24th International Conference on Geoinformatics
Galway, Ireland, August 14 - 20, 2016

Promoting Interdisciplinary Research
Call for Exhibitors & Sponsors: Click here for more information
For registration: Follow the link to Registration page

Deadline for inclusion of abstracts in the conference - June 15, 2016
(All accepted abstracts of authors who have not registered by this deadline will be REMOVED from the conference!!!)
News: We have accepted 860 abstracts

http://www.nuigalway.ie/iseh2016/
The 7th International Conference on Medical Geology “MedGeo2017” to be held in Moscow, Russia, August 28 – September 1, 2017.

The Russian Geological Society (ROSGEO) hosts the Conference with the support of the Ministry of Natural Resources and Ecology of Russian Federation, Ministry of Health Protection of Russian Federation and the International Medical Geology Association (IMGA).

http://www.medgeo2017.org/
IMPORTANT DATES:

July 15, 2016 (midnight): Early bird deadline to register for the LoessFest (reduced rates, see below).
August 26, 2016 (midnight): Final deadline to register for the LoessFest.
September 21, 2016: Icebreaker at the Lismore Hotel, starting at 4:00 pm.
September 22-25, 2016: Dates of the LoessFest.

http://www.loessfest2016.msu.edu/
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Director, Specialised Centre for Chemical Toxicology
University of the Republic
Montevideo, Uruguay
Email: nellymanay@gmail.com

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Prof María Aurora Armienta
Geophysics Institute
Universidad Nacional Autónoma de México
Mexico City, Mexico
Email: victoria@geofisica.unam.mx

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Dr Diego Fridman
Director, Clinical Research Department
Fundación Centro de Estudios Infectológicos
Buenos Aires, Argentina
Email: dfridman@stamboulian.com.ar

COUNCILLORS:

Prof Iossif Volfson
Medical Geology Division
RosGeo
Moscow, Russia
Email: mgeolog1955@mail.ru

Dr Ester Sztein
U.S. National Committees for the Geosciences
Board on International Scientific Organizations of the U.S. National Academy of Sciences
Washington, D.C., USA
Email: esztein@nas.edu

Prof. Héctor Rubio
College of Animal Production and Ecology
Autonomous University of Chihuahua
Chihuahua, México
Email: rubioa1105@hotmail.com

Dr. Darren Beriro
Environmental Geochemist
British Geological Survey
Nottingham, UK
Email: darrenb@bgs.ac.uk

Prof. Laura Börgel
Toxicology and Risk Assessment
Universidad de Chile
Santiago de Chile, Chile
Email: dra.borgel@toxicologia.org

Dr. Cassio Roberto da Silva
Medical Geology and Environ. Geochemistry
Geological Survey of Brazil
Rio de Janeiro, Brazil
Email: cassio.silva@cprm.gov.br

General Secretary
Dr Carla Patinha
Investigadora do GEOBIOTEC - GeoBioSciences, GeoTechnologies and GeoEngineering
University of Aveiro
Aveiro, Portugal
Email: cpatinha@ua.pt

If you wish to share information with all IMGA members through e-news or the IMGA newsletter, please send contributions to: Maria Aurora Armienta email: victoria@geofisica.unam.mx (e-news) or Mark Cave (newsletter) email mrca@bgs.ac.uk