International Mineralogical Association

www.ima-mineralogy.org

FROM THE PRESIDENT

Ekkehart Tillmanns

At IMA's business meeting during the 20th General Assembly in Budapest, August 21 to 27, 2010, a new Council was elected:

President	Ekkehart Tillmanns, Austria
Past-President	Takamitsu Yamanaka, Japan
1st Vice-President	Walter V. Maresch, Germany
2nd Vice-President	Sabine Verryn, South Africa
Secretary	Richard Goed, Austria
Treasurer	Robert T. Downs, USA
Comm. Officer	Frances Wall, UK
Councillors	Patrick Cordier (France) Joel Grice (Canada), Sergey Krivovichev (Russia), Anhuai Lu (China), C. Srikantappa (India)

Past-President Ian Parsons (UK) and Secretary Maryse Ohnenstetter (France) ended their terms on Council after 12 years of service. Councillors Nicolai P. Yushkin (Russia) Marcello Mellini (Italy) and Kari Kojonen (Finland) ended eight-year terms. IMA's thanks and great respect for their service was expressed by the General Assembly at the business meeting in Budapest. I want to emphasise that the great majority of the nearly 1700 participants from 77 countries enjoyed a very successful conference, which, in addition to its scientific value, incorporated a number of very useful organisational ideas, worthy of consideration by organisers of future conferences. Another point to be mentioned is the relatively low conference fee, which nevertheless allowed us to give nearly 200 grants to students and to young and retired scientists.

Directly involved in the organisation of IMA2010 were the national societies of seven European countries, which in alphabetical order were Austria, Croatia, Czech Republic, Hungary, Poland, Romania and Slovakia; societies from Bulgaria, Serbia and Slovenia were associate members of the organising consortium. Even though the participating societies met in Budapest several times each year during the four years of preparation, and of course took an active part in the organisation, the heaviest load rested on the shoulders of our Hungarian colleagues. I would particularly like to mention Tamas Weiszburg from Budapest and Dana Pop from Cluj, Chairman and Secretary of the International Organising Committee, respectively. An impressive fact in comparison to other geoscience conferences I have attended was that out of 29 field trips which were offered, 28 actually took place.

IMA is not a rich organisation, since it can only count on the modest contributions of the national societies. However, we are planning to improve our presence on the web by modernising the web page and by creating an e-mail talk list that can be used to transmit current news and provide an interactive platform for discussions. We are also deliberating the production of a periodical newsletter that could be distributed via this e-mail list. The IMA's work continues between the quadrennial meetings, mainly through the activities of the commissions and working groups (details at www.ima-mineralogy.org).

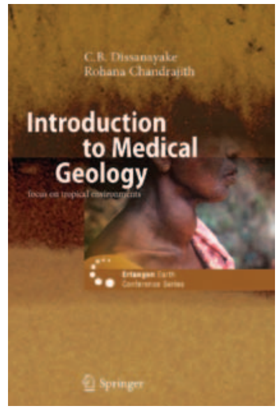
The next yearly Council meeting will take place at the 2011 Goldschmidt Conference in Prague, August 14 to 19, where several IMA commissions will also hold sessions. The next biennial business meeting will be held during the first European Mineralogical Conference in Frankfurt, September 9 to 13, 2012.

The very positive response which we carried home from our meeting in Budapest gives reason to hope that the future of the International Mineralogical Association will be fruitful and active.

Ekkehart Tillmanns, IMA President

BOOK REVIEW

INTRODUCTION TO MEDICAL GEOLOGY[1]



The authors of *Introduction to Medical Geology* are to be commended for having undertaken the complex task of joining the geological and geochemical aspects of our planet with the geographical settings of people in the tropics. The subject is particularly pertinent to those who suffer inadvertently from the natural and often "silent" hazards of their environment. "Medical geology," an interdisciplinary science, is a new arena of cooperation in which numerous avenues of exciting research opportunities are opening up. The idea behind medical geology is to combine available geological, particularly geochemical, data on an environment with biological data typical of its habitats, with the goal of determining the potential impacts of this environment on the human and animal populations. Through this overarching and basic approach, medical geology seeks to gain new understanding of the factors that contribute to human well-being and disease. It is possible, although difficult, to identify unique, direct causes and effects, as this book demonstrates. The interaction of geoscience specialists with medical/dental practitioners and researchers encompasses enormously diverse disciplines. These disciplines often have distinct vocabularies and approaches, so exchanges usually oblige the participants to learn new terminologies. Considering the Earth as a complex of systems is not unlike identifying the whole body, with its separate parts and systems, as normal or pathological. The approach integrates the contributions of natural Earth materials and processes and their potential to impact populations. The goals are to reduce exposure, morbidity, and death and to gain insights that can be applied around the globe. As a factor in our continued survival, the need to document and understand the characteristics and processes of our biogeochemical environment is just beginning to be appreciated. The study of the many aspects and factors involved in the interplay of the environment with health is in its infancy. This volume is a fine start.

The basic concepts of medical geology are outlined and discussed in the early chapters of *Introduction to Medical Geology*. After an introductory chapter that puts the subject in perspective, chapter 2, entitled "Geochemistry of the Tropical Environment," delves into subjects like the nature of the tropical environment, the mechanisms of rock weathering and soil formation in the tropics, and the hydrogeochemistry of this environment. These are important subjects to understand, because over 70% of the world's population live in tropical environments. These people often suffer from malnutrition because of highly weathered soils, a condition that leads to low agricultural productivity and a low availability of essential nutrients. Because most of the individuals are poor, they usually live close together, they may have little drinking water and what water they have may be polluted, and they may have minimal access to medical expertise and care. Their outlook is short life spans, and many families endure multiple childhood disasters. Understanding the geology, geomorphology, and lithology of a terrain; the soils in this terrain; its waters, including groundwater; and the cycles of essential and trace elements are prerequisites for improving the lives and lifestyles of these people.

Chapter 3 is entitled "Bioavailability of Trace Elements and Risk Assessment." It considers the themes announced in the chapter title, and also subjects like cause and effect, and epidemiology and homeostasis in medical geology. The presence of specific elements in soils and streams has been effective in locating concealed ore deposits. Similar

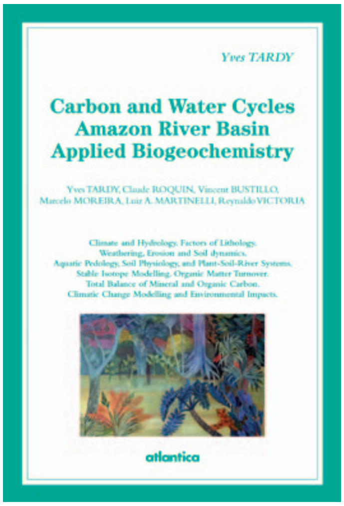
1 Dissanayake CB, Chandrajith R (2009) Introduction to Medical Geology: Focus on Tropical Environments. Springer-Verlag, Berlin, 297 pp, ISBN978-3-642-00484-1, $169

methodologies can identify concentrations of potentially hazardous elements and their bioavailability in particular populations, and they can govern the acquisition of the data required to test potential instigators of disease in populations. Correlating the levels of specific elements in waters, soils, and even air with the incidence of specific disorders, morbidity, and death over time is the focus of epidemiological studies. Such evaluations of health impacts on a range of species in specific situations can be used to identify not only hazards but potential hazards, like toxic contaminants, and can contribute to the computation of the risks in any environment. Focusing on the demise of a range of species can aid in making decisions for other living forms, such as the decision to undertake experimental investigations and to consider the dose administered and dose absorbed in more absolute terms.

With the background developed in the early chapters, the reader of *Introduction to Medical Geology* can explore individual chapters concerning trace elements and substances like fluorine, iodine, arsenic, selenium, and nitrates, as well as the "hard" waters that appear to contribute to cardiovascular diseases and urinary stone formation. The reader can also gain insight via brief reviews on the subjects of geophagy, podoconiosis (elephantitis), and radioactivity in some tropical environments. The case studies presented in the book contain maps; tables with detailed elemental concentrations in soils, waters, and plants; and discussions of issues pertinent to the local context. Many of the elemental hazards are already well known, but they are discussed in detail and well documented in this volume. The book treats examples such as the high concentration of fluorine in tea in China; arsenic in the waters of Bangladesh and Bengal; and iodine deficiency disorders (goiter) in Sri Lanka, India, and the Maldives. Since the authors are from Sri Lanka, a focus on that country might be expected. However, this is clearly not the case, as is shown by the reiterations of the basic concepts of medical geology throughout the book, the references to multiple papers by Dissanayake over the years, and the final chapter that depicts baseline geochemical maps—a recent undertaking in China and a harbinger of the future. As people, at least those in the US, become increasingly intrigued with their own personal health and climate change, this integration of disciplines will in all probability grow. Perhaps the most telling summary of the position of the authors and of this new field of medical geology is the final statement on page 257: "The human body is only a small part of a larger geochemical cycle. Medicine stands to gain by the proper understanding and application of Geology."

H. Catherine W. Skinner, Yale University
catherine.skinner@yale.edu

CARBON AND WATER CYCLES AMAZON RIVER BASIN APPLIED BIOGEOCHEMISTRY[2]



Carbon and Water Cycles Amazon River Basin Applied Biogeochemistry by Yves Tardy, Claude Roquin, Vincent Bustillo, Marcelo Moreira, Luiz A. Martinelli, and Reynaldo L. Victoria is an examination of the Amazon River in terms of its hydrology, biogeochemistry, and sediment transport. This book is based on data collected from 1982 to 1991 during the Carbon in the Amazon River Experiment (CAMREX). CAMREX sampled the main channel of the Amazon River and seven major tributaries in Brazil with the objective of characterizing processes that control the distribution of bioactive elements (C, N, P, and O) (Richey et al. 1990, 2008). Sampling proceeded from upstream to downstream in order to follow the water as it evolved, and special "isokinetic" techniques were used to ensure that representative samples were collected (Meade et al. 1985). The CAMREX data and bibliography were recently published in an Internet archive (Richey et al. 2008). None of the 109 CAMREX publications deals with major elements or with the interlinked bioactive element–sediment biogeochemistry of the Amazon River system. This book addresses this omission.

The authors endeavor to tie together the entire CAMREX data set, including carbon and light-isotope data. This characterization of Amazon biogeochemistry as a unified whole is done through a system of generalized models. These models are supported by an extensive bibliography and discussions of geology, soils, the water cycle, soil hydrology, weathering and soil genesis, and the cycling of organic matter. Other chemical data supplement the discussion, notably for water isotopes and strontium isotopes.

It is not possible to read this book by itself because it represents only a part of the published work. For a better grasp of the subject, the reader would be wise to acquire the first in this series of publication, Tardy et al. (2005). This article includes much of the background material for the book. The processed data tables are also available in the web archives of the journal article. There are significant differences between the processed data and the tables of Richey et al. (2008), especially for ammonia, sulfate, chloride, and silica.

The approach adopted by the authors and explained in this book has several key modeling features. The core feature is a three (plus) end-member hydrographic separation of the discharge of each river into baseflow (R_B), intermediate flow (R_I), and surficial flow (R_S) components. For each constituent, X, in each river, these three components have a fixed concentration (X_B, X_I, X_S). R_D, a subcomponent of R_B/R_S, is defined in order to assess processing through alluvial soils in the lowlands. The rules underlying the hydrographic separation are found in Tardy et al. (2005). An inspection of the results presented in Appendix III of the book reveals some improbable results, such as the extremely elevated calcium, magnesium, and potassium in R_S and R_I, and as compared to R_B in the upper Solimões River, which is inconsistent with Andean biogeochemistry (see McClain and Naiman 2008).

Another feature is the development of interpretive indexes to characterize each tributary basin. Two important indexes use sample properties to infer geomorphic and geologic characteristics of the subbasins, rather than using mapped topography and geology. This presentation was weak. The slope index, I_{SLOP}, is the ratio of average coarse to total suspended sediment. The second index, I_{CARB}, is the ratio of bicarbonate derived from the weathering of carbonate minerals to the total bicarbonate derived from all sources. Unfortunately for the reader of the book, the details of this calculation are in the PhD thesis of Bustillo (2005), one of the coauthors. Other features include a characterization of how evaporation and transpiration vary with runoff and temperature. This is used to develop a variety of indexes that characterize evaporative concentration in samples. The consistency of this calculation was tested with the isotope data.

After considerable development, the book closes with a discussion of the carbon cycle in Amazonia. In this final chapter, the authors attempt to examine the impact of climate change on the biogeochemistry of the Amazon, considering wetter and drier climate scenarios. This discussion is the culmination of the book. Biological productivity, respiration, and decay at a river-basin scale are linked together. The hydrographic end-members are used to distinguish types of biological–hydrological regimes by relating the four different end-members to different soil-profile environments. The arguments are complicated, but generally reasonable.

I recommend this book to all biogeochemistry researchers working in the Brazilian Amazon or other large tropical rivers; however, it is a difficult book to use. The book is dedicated to the memory of Robert M. Garrels. I had been hoping to encounter the smooth, tightly integrated, and finished quality of Garrels and Mackenzie's *Evolution of Sedimentary Rocks* (1971). Nonetheless, this book is an admirable attempt to complete the important and valuable study of the Amazon River undertaken during the CAMREX project. It will be up to others to develop better indexes and ways to model biogeochemical drivers based on interpretations derived from Geographic Information Systems and satellites and more comprehensive distribution models.

Robert F. Stallard
Smithsonian Tropical Research Institute,
República de Panamá
E-mail: stallard@si.edu

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