



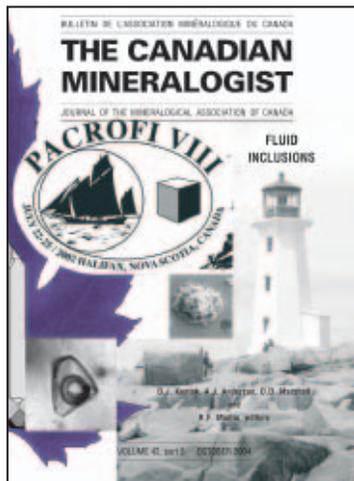
## Mineralogical Association of Canada

### FLUID AND MELT INCLUSIONS Alive and Well Thank You!

Daniel J. Kontak

The October issue of *The Canadian Mineralogist* includes a collection of papers stemming from the biennial meeting of the Pan-American Conference on Research on Fluid Inclusions (PACROFI) held in Halifax, Nova Scotia, in July 2002. These biennial meetings have provided a stimulating forum, for both advanced researchers and budding enthusiasts, on fluid and melt inclusion research over the past two decades. The collected abstracts (available at [kontakdj@gov.ns.ca](mailto:kontakdj@gov.ns.ca)) and recently published papers cover such diverse topics as experimental techniques, novel analytical methods, P-T-t modeling of liquid petroleum inclusions, the assessment of ore deposit environments, culturing ancient microorganisms in primary fluid inclusions of halite, the documentation of Lower Paleozoic sea water chemistry, etc. Collectively the abstracts and papers reflect an area of active, vibrant, and exciting research. Below is a summary of the published papers.

The issue commences with applications of analytical techniques and theoretical modeling to extract meaningful data from inclusions. Linnean et al. use Fourier infrared spectroscopy on inclusions with varied mixtures of H<sub>2</sub>O and CO<sub>2</sub> to deduce an empirical equation relating absorbency to the H<sub>2</sub>O:CO<sub>2</sub> ratio. Bakker addresses the issue of determining salinity and ion ratios in inclusions by combining cryogenic Raman spectrometry and microthermometry in mixed H<sub>2</sub>O-NaCl-MgCl<sub>2</sub> inclusions. An alternative method for determining solute chemistry is presented by Kontak, who describes the imaging and analysis (EMPA) of artificially generated evaporate mounds from inclusions. In contrast, a more rigorous analytical technique to define inclusion chemistry is presented by Gagnon et al., who integrate thermometric measurements with laser ablation ICP-MS in a real case example. In a novel paper, Elwood Madden et al. report on simulation of shock-induced re-equilibration of fluid inclusions



to prepare the way for examining inclusions in extraterrestrial objects and impact sites. Finally, Burnley and Davis use finite-element modeling to examine volume changes in fluid inclusions due to changing P-T conditions.

However, it is the application of fluid inclusion studies to the natural environment that is the prime focus of inclusion work,

and several papers illuminate this with clarity. Two papers on vein gold deposits (Mernagh et al. and Baker and Seccombe) combine fluid inclusion thermometric data with Raman analysis to characterize the fluid chemistry and ore formation. Similarly, Carruzzo et al. and Yang et al. integrate fluid inclusion and stable isotope data to examine the nature of fluids associated with mineralization in granitic rocks of Maritime Canada. Interestingly, despite similar settings, the fluid characteristics are notably different, with the deep penetration (10–12 km) of meteoric water demonstrated for one area. In another magmatic-related environment, Shin et al. described As-Bi-mineralized veins from South Korea and integrate fluid inclusion and stable isotope studies. The features of higher level, epithermal settings are addressed in two papers. Moore et al. discuss an active geothermal system in Indonesia, and in particular, the consequences of descending acid-sulfate waters. In contrast, Kouzmanov et al. describe the genesis of a high-sulfidation assemblage from a Bulgarian mineral deposit and apply infrared microscopy to the study of the textures and fluid inclusions of opaque phases.

The concluding papers illustrate well the forensic nature of inclusion studies. Marshall et al. characterize fluid conditions that favoured emerald formation in new localities in northern Canada. Next, Schandl combines fluid inclusion and mineralogical studies to constrain precious- and base-metal mineralization at a new site in the strongly mineralized Sudbury Basin. Buijs et al. describe an unusual and unique setting of fluid inclusions, in which microborings are preserved as fluid inclusions. Finally, the magmatic evolution within a mineralized porphyry setting is deciphered by Student and Bodnar by applying melt inclusion studies.

This issue of *The Canadian Mineralogist* presents an excellent synopsis of exciting work in a field that continues to be limited only by one's imagination. Sit back, scroll through the pages, and see authors turn the remarkable into the possible.

<http://pubs.nrc-cnrc.gc.ca/mineral/MN42-05.html>

## MAC NEWS

### Executive Meeting

MAC's Executive met in Montreal on October 23 and 24. Our discussions focused mainly on the incoming 50<sup>th</sup> anniversary celebrations. President Kontak also led a discussion on how we can improve collaboration with other Canadian Earth science societies and how we can broaden our appeal to the Canadian geochemical community.

### Montreal 2006

A dynamic local organizing committee is in place to prepare a memorable GAC-MAC annual meeting, from May 15 to 17, 2006, in Montreal. The Technical Program Committee, chaired by Andrew Hynes, is putting the finishing touches on a program that will explore many of the themes of the International Year of Planet Earth. Montreal is a favourite tourist destination, easy to get to, and should be especially nice in spring.



### 50<sup>th</sup> Anniversary Celebrations

Several events are planned for Halifax 2005, May 15–18, 2005, to celebrate MAC's 50<sup>th</sup> birthday. A two-day symposium, convened by Frank Hawthorne, will feature invited contributions from leaders in the mineral sciences in Canada and beyond. The invited papers will be published in a special issue of *The Canadian Mineralogist*. A plenary talk entitled "Minerals are not just chemical compounds" will be given by Ian Parsons, President of the International Mineralogical Association. A public lecture at a local museum by André Lalonde on minerals in everyday life and a special exhibition of minerals from the Pinch collection of the Canadian Museum of Nature will be part of the outreach program. And of course, we will have a birthday party with cake and a visual presentation of the highlights of MAC's history. Join us!

### The Canadian Light Source is On

The Canadian Light Source had its official opening on Thursday, October 21, and it made Canadian television history. Indeed, CBC's *The National* with host Peter Mansbridge was broadcast to the country from atop the CLS storage ring, before a delighted crowd of CLS staff, guests from the University of Saskatchewan,

and their families. It was the first time that a national news program had ever been broadcasted from a Canadian science facility. Mr. Mansbridge was joined by science columnist Bob McDonald and CLS staff scientist Dr. Colleen Christensen. The CLS was built in Saskatoon, Saskatchewan, at a cost of \$173 million and will be used by researchers from 18 different universities across Canada.

## \$10 000 Scholarship

Deadline to apply:  
May 1, 2005

The Mineralogical Association of Canada Foundation annual scholarship for graduate students involved in an MSc or PhD thesis program in the fields of:

MINERALOGY • CRYSTALLOGRAPHY • GEOCHEMISTRY •  
MINERAL DEPOSITS • PETROLOGY

For more information, contact: **Roger H. Mitchell**, Department of Geology, Lakehead University, Thunder Bay ON P7B 5E1 E-mail: [rmitchel@lakeheadu.ca](mailto:rmitchel@lakeheadu.ca)

Terms of reference and application forms at  
[www.mineralogicalassociation.ca](http://www.mineralogicalassociation.ca)

### Short course on

## EXPLORATION FOR PLATINUM-GROUP ELEMENT DEPOSITS

August 6–7, 2005

ORGANIZERS: **Dr. James E. Mungall**  
(Department of Geology, University of Toronto) and

**Dr. Markku Iljina** (Geological Survey of Finland, Rovaniemi)

SPONSORS: **IGCP Project 479** "Sustainable use of the PGE in the 21st century: Risks and opportunities", the Mineralogical Association of Canada, and the Geological Survey of Finland.

Interest in mineral deposits of the platinum-group elements (PGE) is at an all-time high. Demand is growing rapidly for these metals, which are prized as catalysts for automotive fuel cells or pollution abatement systems. The shrinking global reserves of the PGE, primarily hosted by only two countries, Russia and South Africa, are prompting a search for new deposits. This two-day short course will be held at the Ramada Hotel in the city centre of Oulu, Finland. The fee is 160 (double occupancy) or 200 (single occupancy) and includes hotel accommodation for one night, breakfasts, lunches, and dinner. The minimum number of participants is 10.

This course and its accompanying short-course volume are intended to fill a gap between the knowledge and experience of practising exploration geologists and the academic research community. The aim is to give non-specialist geologists a series of tools with which they can identify prospective areas, recognize significant indicators of mineralization, and synthesize geological, geochemical, and geophysical data to make new discoveries of PGE mineralization.

The course will begin with reviews of the geochemical controls on the distribution of PGE in igneous, hydrothermal, and surficial environments. The next section will comprise descriptive ore deposit models of the principal PGE producers and marginally economic but large-tonnage deposits. Controversial genetic models will be presented in a non-partisan way.

The sections on exploration methods will be presented by practitioners with extensive experience in mineral exploration. The emphasis will be on recognition of the signatures of mineralized bodies using geological, geochemical or geophysical probes.

For more information and the tentative workshop program:

<http://platinumsymposium oulu.fi/pdfs/Workshop3Program.pdf>



# MERCURY



**SOURCES, MEASUREMENTS, CYCLES, AND EFFECTS**

**Mineralogical Association of Canada Short Course**  
Co-sponsor: Environmental Earth Sciences Division, Geological Association of Canada  
**May 14-15, 2005**, prior to the GAC-MAC-CSPG-CSSS  
Joint Annual Meeting, Halifax, Nova Scotia, Canada

**Conveners:** Michael B. Parsons and Jeanne B. Percival, Natural Resources Canada

**OVERVIEW**

Mercury and mercury compounds are of significant human and environmental health concern because of their toxicity and ability to accumulate in fish and wildlife. Levels of mercury in the environment have risen considerably since the onset of industrialization, and even remote locations such as the Canadian Arctic have been adversely affected by the long-range atmospheric transport of mercury. This short course will discuss the current state-of-knowledge regarding:

- (1) natural and anthropogenic sources of mercury; (2) sampling protocols and analytical methods;
- (3) transport and transformation of mercury in the environment; and
- (4) effects on ecosystems and human health.

Most of the course material will be presented at a level suitable for senior undergraduate and graduate students and should appeal to all scientists interested in environmental issues. A two-day Special Session on Mercury in the Environment will complement the short course.

**TOPICS**

History of Hg and its environmental impact (M. Parsons & J.B. Percival, GSC); Geogenic sources of Hg (J. Rytuba, U.S. Geological Survey); Anthropogenic sources and global inventory of Hg emissions (J. Pacyna & E. Pacyna, Norwegian Inst. for Air Research); Field sampling and analytical protocols for total Hg (G. Hall, GSC); Inorganic Hg speciation methods (J. Lu & D.C. Grigore, Ryerson Univ. / GSC); Speciation of Hg using synchrotron radiation (C. Kim, Chapman Univ.); Measurement of gaseous Hg flux in the terrestrial environment (P. Rasmussen et al., Health Canada); Biogeochemical Hg cycles (D. Krabbenhoft et al., U.S. Geological Survey); Atmospheric distribution and long-range transport of Hg (C. Banic et al., Environment Canada); Hg in the marine environment (G. Gill & R. Mason, Texas A&M Univ. / Univ. of Maryland); Differentiating natural and anthropogenic Hg in animals (P. Outridge, GSC); Hg in biota and its effects (N. Burgess, Environment Canada); Hg exposure and human health effects (M. Barlow & S. Gupta, Health Canada); Hg management in Canada: domestic and global dimensions (G. Howland, T. Bender, & L. Hayes, Environment Canada).



**Registration fees** (PRIOR TO APRIL 15, 2005): CDN \$400 (regular) and CDN \$250 (students).  
For more information e-mail Michael Parsons ([Michael.Parsons@NRCan.gc.ca](mailto:Michael.Parsons@NRCan.gc.ca)), or visit the conference website:  
[www.halifax2005.ca](http://www.halifax2005.ca)