

## Exploration History and Mineral Potential of the central Arctic Zn-Pb District, Nunavut

### Keith Dewing

Geological Survey of Canada, 3303-33rd St NW,  
Calgary AB T2L 2A7

E-Mail: [kdewing@NRCan.gc.ca](mailto:kdewing@NRCan.gc.ca)

### Robert J. Sharp

(Formerly Chief Geologist, Polaris Mine)

Trans Polar Geological, 60 Hawkmount Heights NW,  
Calgary AB T3G 3S5

### Ted Muraro

4438 Stone Court, West Vancouver, BC V7W 2V5

The Polaris Zn-Pb District in the central Arctic islands of Nunavut provides an unusual opportunity to examine a complete mineral exploration cycle in a northern frontier area, and to document some of the internal and external drivers that affected the exploration and discovery process. This paper is a summary of Dewing et al. (2006).

The Polaris Zn-Pb District covers an area that is 450 km north-south by 130 km east-west between Somerset Island in the south and the Grinnell Peninsula of Devon Island in the north (Figure 1). About 80 Pb-Zn showings have been found. The largest deposit was the Polaris Mine, located on Little Cornwallis Island (Fig. 1). The Polaris deposit was a carbonate-hosted (MVT) Zn-Pb deposit of about 20 Mt grading about 17% Zn+Pb. The ore body consisted of sphalerite and galena, along with pyrite, dolomite and calcite. Polaris was in operation from 1980 to September 2002.

### Exploration Cycle (1960-2002)

There were five phases of exploration in the central Arctic Zn-Pb District (Fig. 2). The initial exploration phase (1960-1970) spanned the time between discovery of the Polaris showings by an oil exploration crew in 1960 and the discovery of the Polaris ore body by drilling in 1971 (Fig. 2). Smaller showings were discovered on Cornwallis and Little Cornwallis islands based on

aerial reconnaissance (Figs. 1, 2). Work was done primarily by Cominco Ltd, with Canadian Superior Exploration starting an exploration program in 1970. This exploration phase failed to find a large deposit on surface. Following a review of the existing data, the decision was made by Cominco to explore for buried deposits near the known showings using geophysical techniques.

The second phase (1971-1979) spans the time between discovery of the Polaris ore body and beginning of underground development (Fig. 2). The Polaris deposit was drilled in 1971 on an anomaly detected during a gravity survey of the Polaris Peninsula. Delineation drilling was started at Polaris, along with an exploration adit. Discovery of the Polaris ore body led to a flurry of regional exploration, resulting in the discovery of showings on Truro and

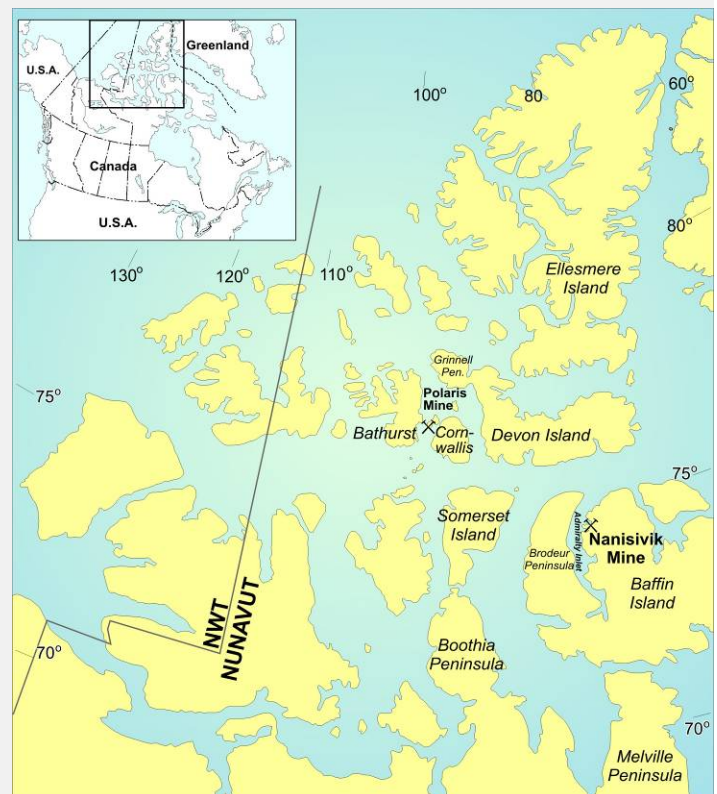


Fig. 1. Location of the Polaris Mine and the Canadian Arctic Islands.

(Continued on page 4)

### Inside this issue:

Symposium Review	7
'06 CIM GeoSoc Field Conference	10
Exploration07	12
Calendar of Events	16

## 2006-2007 GAC MINERAL DEPOSITS DIVISION EXECUTIVE LIST

### **Chairperson: Suzanne Paradis**

Natural Resources Canada, 9860 West Saanich Road, Room 4718, Sidney, BC V8L 4B2; Tel: (250) 363-6732;  
Fax: (250) 363-6565  
Email: suparadi@NRCan.gc.ca

### **Past Chairperson: Jan Peter**

Geological Survey of Canada, 601 Booth Street, Ottawa, ON K1A 0E8; Tel: (613) 992-2376; Fax: (613) 996-3726  
Email: jpeter@NRCan.gc.ca

### **Vice Chairperson: Garth Kirkham**

Kirkham Geosystems Ltd., 3178 Three Cedars Drive, Vancouver, BC V5S 4K5; Tel: Fax:  
Email: gdkirkham@shaw.ca

### **Secretary: Jim Walker**

New Brunswick Department of Natural Resources, PO Box 50, Bathurst, NB E2A 3Z1; Tel: (506) 547-2070;  
Fax: (506) 547-7694  
Email: jim.walker@gnb.ca

### **Treasurer: Jason Dunning**

Expatriate Resources, Suite 475, 701 Howe Street, Vancouver, BC V6C 2B3; Tel: (604) 682-5474, ext. 225;  
Fax (604) 682-5404  
Email: jasondunning@expatriateresources.com

### **Publications: Dirk Tempelman-Kluit**

Tempelman-Kluit Consulting, 4697 West 4th Avenue, Vancouver, BC V6R 1R6; Tel: (604) 224-5582; Fax: (604) 224-6903  
Email: dirktk@telus.net

### **Professional Development—Field Trips:**

#### **Dani Alldrick**

BC Geological Survey, 5 - 1810 Blanshard Street, Victoria, BC V8T 4J1; Tel: (250) 952-0412; Fax: (250) 952-0381  
Email: Dani.Alldrick@gems6.gov.bc.ca

### **Short Course Coordinator:**

#### **Dan Layton-Matthews**

Department of Geological Sciences, Queen's University, Kingston, ON K7L 3N6; Tel: (613) 553-6338; Fax: (613) 533-6592  
Email: dlayton@geol.queensu.ca

### **Medals Committee and Website Manager:**

#### **Dan Marshall**

Dept. of Earth Sciences, Simon Fraser University, Vancouver, BC; Tel: (604) 291-5474; Fax: (604) 291-4198  
Email: marshall@sfu.ca

## 2006-2007 GAC MINERAL DEPOSITS DIVISION DIRECTORS

### **• Ross Sherlock (2006-2009)**

Miramar Mining Corporation, Suite 300, 889 Harbourside Drive, North Vancouver, BC; Tel: (604) 985-2572;  
Fax: (604) 980-0731  
Email: rsherlock@miramarmining.com

### **• Ken Hickey (2006-2009)**

MDRU—University of British Columbia, 6339 Stores Road, Vancouver, BC V6T 1Z4; Tel: (604) 822-6136; Fax: (604) 822-6088  
Email: khickey@eos.ubc.ca

### **• Luke Ootes (2006-2009)**

NWT Geoscience Office, P.O. Box 1500, Yellowknife, NWT X1A 2R3; Tel: (867) 669-2641; Fax: (867) 669-2725  
Email: luke\_ootes@gov.nt.ca

### **• Bob Cathro (2004-2007)**

Cathro Exploration Corporation, 3230 Dogwood Road, RR #1 Chemainus, BC, V0R 1K2; Tel: (250) 246-4738;  
Fax: (250) 246-4738  
Email: bobcat62@telus.net

### **• Steve Rowins (2006-2009)**

Department of Earth and Ocean Sciences, University of British Columbia, Vancouver, BC; Tel: (604) 822-9561;  
Fax: (604) 822-6088  
Email: srowins@eos.ubc.ca

### **• Rebecca Sproule (2004-2007)**

Geodiscovery Group, P.O. Box 59, Sherwood, Queensland, 4075, AU; Tel: 61 (7) 3278 5733; Fax: 61 (7) 3278 5744  
Email: RAS@geodiscovery.com.au

### **• Craig Hart (2004-2007)**

School of Earth and Geographical Sciences, The University of Western Australia, 35 Stirling Highway, Crawley, Western Australia, 6009, AU; Email: chart1@cyllene.uwa.au

### **• Robert Carpenter (2005-2008)**

Kaminak Gold Corporation, Suite 1440, 625 Howe Street, Vancouver, BC, V6T 2T6; Tel: (604) 646-4520;  
Fax: (604) 646-4526  
Email: robc@committeebay.com

### **• Moira Smith (2005-2008)**

TECK COMINCO Limited, #600 - 200 Burrard Street, Vancouver, BC V6C 3L9; Tel: (604) 640-5373;  
Fax: (604) 685-3069  
Email: moira.smith@teckcominco.com



## 2006-2007 CIM GEOLOGICAL SOCIETY EXECUTIVE LIST

### **President: Steve McRoberts**

Teck-Cominco Ltd., PO Box 938, Stn. Main, Kamloops, BC, V2C 5N4; Tel: (250) 372-0032; Fax: (250) 372-1285  
Email: steve.mcroberts@teckcominco.com

### **Past President: Damien Duff**

Ontario Ministry of Northern Development and Mines  
Willett Green Miller Centre, 933 Ramsey Lake Road  
Sudbury, ON, P3E 6B5; Tel: (705) 670-5876;  
Fax: (705) 670-581  
Email: damien.duff@ndm.gov.on.ca

### **Vice President: Chris Davis**

Inco Technical Services Ltd., P.O. Box 1516, Capreol, ON, P0M 1H0; Tel: (705) 858-0386  
Email: cdavis@inco.com

### **Vice President Elect: Position Vacant**

### **Secretary/Treasurer: Position Vacant**

### **Publications/Newsletter Editor: David Sinclair**

Geological Survey of Canada, 601 Booth Street, 6th Floor,  
Room 675, Ottawa, ON, K1A 0E8; Tel: (613) 992-9810;  
Fax: (613) 996-3726  
Email: Dave.Sinclair@nrcan-rncan.gc.ca

### **Field Conference Coordinator: Position Vacant**

### **Councillors: V. Bodycomb**

**A. Conly**

**C. Moreton**

**D. Paktunc**

**R. Pressacco**

**L. Reed**



## 2006-2007 CIM GEOLOGICAL SOCIETY REPRESENTATIVES

### **• Damien Duff (Awards/Nominations)**

Ontario Ministry of Northern Development and Mines  
Willett Green Miller Centre, 933 Ramsey Lake Road  
Sudbury, ON, P3E 6B5; Tel: (705) 670-5876;  
Fax: (705) 670-581  
Email: damien.duff@ndm.gov.on.ca

### **• George O'Reilly (Bulletin Associate Editor)**

Nova Scotia Department of Natural Resources, P.O. Box 698,  
Halifax, NS, B3J 2T9; Tel: (902) 424-2517; Fax: (902) 424-0527  
Email: gaoreill@gov.ns.ca

### **• Jeremy Richards (EMG Editor)**

Department of Earth and Atmospheric Sciences, University of  
Alberta, Earth Sciences Building Room 3-02, Edmonton, AB,  
T6G 2E3; Tel: (780) 492-3430; Fax: (780) 492-2030  
Email: Jeremy.Richards@ualberta.ca

### **• Tom Schroeter (Special Volumes Editor)**

British Columbia Geological Survey, Vancouver Mineral Devel-  
opment Office, Mining and Minerals Division, Suite 300-865  
Hornby Street, Vancouver, BC, V6Z 2G3; Tel: (604) 660-2812  
Email: Tom.Schroeter@gov.bc.ca

### **• David Lentz (Liaison)**

University of New Brunswick, Department of Geology, PO Box  
4400, Fredericton, NB, E3B 5A3; Tel: (506) 453-4804; Fax:  
(506) 453-5055  
Email: dlentz@unb.ca

### **• Andrew Conly (Mineral Deposits Re- search/University Visiting Lecturer)**

Lakehead University, Department of Geology, 955 Oliver Road,  
Thunder Bay, ON, P7B 5E1; Tel: (807) 343-8463;  
Fax: (807) 346-7853  
Email: andrew.conly@lakeheadu.ca

### **• Venetia Bodycomb (Public Affairs)**

Université du Montréal à Québec, 201 avenue du Président-  
Kennedy, local PK-6151, Montréal, PQ, H2X 3Y7;  
Tel: (514) 987-4194; Fax (514) 987-7749  
Email: bodycomb.venetia@uqam.ca

### **• E. Debicki (Sudbury Section Representative)**

### **• B. Reilly (Saskatoon Section Representative)**

### **• R. Linnen/P. Olson (Conferences/Symposia)**

Dundas islands and on Grinnell Peninsula (Fig. 1). Most of the surface showings in the district received limited drill testing to see if any were the surface expression of a larger ore body. About half of the exploration drilling was by Cominco Ltd, the other half by Canadian Superior Exploration. Drilling ceased between 1976 and 1979 as regulatory approval for Polaris Mine was sought and mine feasibility studies completed.

The third phase (1980-1988) was dominated by ore delineation drilling at Polaris Mine and exploration on the Polaris Peninsula (Fig. 2). Cominco was the only company active in the district.

The fourth phase (1989-2002) saw a decline in drilling at Polaris as the deposit was fully delineated and exploration potential in the immediate vicinity the Polaris Mine exhausted (Fig. 2). Cominco's regional exploration stepped up, with extensive drill testing of showings near Polaris (Eclipse and Truro). Distant showings were drill tested and new showings were found and drilled on Bathurst and Somerset islands. BHP Minerals (1994-1996) and Noranda (1997-2001) engaged in regional exploration, culminating with extensive drilling by Noranda on Grinnell Peninsula. Polaris Mine closed due to depletion of the ore body in September 2002.

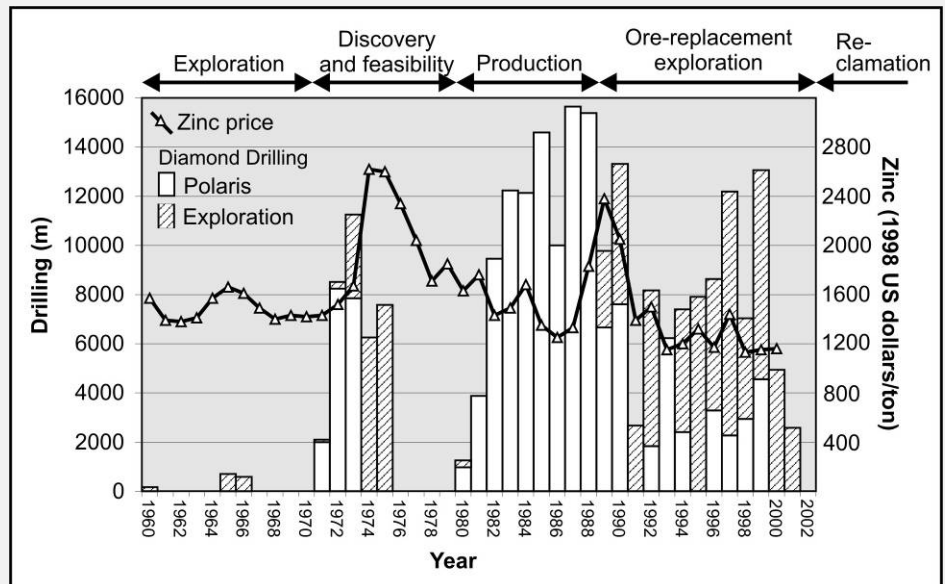
The fifth phase (2003-2005) saw the removal of infrastructure at the Polaris Mine site (Fig. 2). The closure of the mine also marked the end of regional exploration. This was in part due to protracted low zinc price and the lack of a large discovery, but the mine closure also resulted in a reduction of logistical support and an increase in costs in the central Arctic Islands. This was especially true for flights from the south, and exploration crews also lost access to Polaris Mine's cheap (sea-lifted) supplies.

### Exploration Response

The number of discoveries grew slowly following discovery of the Polaris showing in 1960. The cumulative discovery curve (Fig. 3) shows the number of known showings, plotted on a logarithmic scale, against year of discovery. The best-fit curve is the 'discovery curve'. The total number of showings is estimated to be about 135, of which 82 are known, is derived by projecting the discovery curve until it is essentially flat (in year 2050).

The discovery curve (Fig. 3) illustrates the step-wise discovery process. The upward step shows a number of discoveries being made in a one to three year exploration program. This is followed by a period during which the newly discovered showings are assessed by mapping, geophysics and drilling (labelled "assessment" on fig. 3). There is then a lull ("disappointment" on fig. 3) during which exploration is on hold. Once the number of discoveries drops below the expected discovery curve, there is a sense that the district is under-explored and a new exploration program begins. Figure 3 predicts that a sense of being under-explored will occur after 2010 and new exploration in the central Arctic Islands will be unlikely before 2015. As more showings are discovered, there is a longer period between exploration programs because the expected rate of discovery drops and it takes longer to generate a sense that an area is under-explored.

Most discovery processes are logical; the largest target is tested first then progressively smaller targets are sought out. This holds especially true in the oil and gas sector where there are independent measures of prospect size (i.e., seismic closure) and in which there are fewer financial constraints. For instance, analysis of the distance of oil wells in the Arctic Islands from the main staging area at Rae Point on Melville Island shows that there were few logistical constraints in the early part of the exploration program, and many wells were drilled at a great distance from Rae Point. As the oil exploration cycle progressed, wells were drilled closer to the main discoveries on north-



**Fig. 2.** Exploration and ore-definition drilling in the central Arctic Island lead-zinc district between 1960 and 2002. Historical zinc prices from <http://minerals.usgs.gov/minerals/pubs/commodity/zinc/720798.pdf>.

ern Melville Island as Panarctic Ltd tried to increase reserves near its anchor fields to make an economically-viable project.

The central Arctic Zn-Pb District is different. Exploration generally progressed from Polaris outward (Fig. 4), and logistics rather than geological prospectivity controlled the exploration program. This likely resulted from the smaller budgets available to mining exploration, the economic advantage to finding additional reserves close to the producing mine, and because there were no reliable criteria for ranking a showing's exploration potential. Because logistics controlled the target selection rather than geology, the standard assumption of a logical discovery process (largest target to smallest target) is likely invalid. This means that large, untested targets may still occur in the district.

### Discussion

Factors affecting the timing and rate of exploration are generally intrinsic to the region. In the case of Polaris these factors include: 1) discovery of showings in 1960; 2) discovery of Polaris orebody in 1971; 3) declining reserves between 1989-2002; 4) closure of the mine in 2002 and attendant loss of logistics; 5) the short exploration season and difficult logistics; and 6) lack of competition from local prospectors or other companies. The external drivers to Polaris include: 1) oil-related exploration that led to the discovery of the Polaris showings, 2) the onset of the two regional exploration periods (1974 and 1989) are coincident with zinc price spikes (Fig. 2) otherwise there is little correspondence between commodity price and exploration activity, and 3) the surge in scientific interest in carbonate-hosted Pb-Zn deposits in 1967 helped industry geologists get their exploration program approved.

As many of the factors affecting exploration are intrinsic to the region, policy makers interested in resource evaluation and exploration in frontier areas like the Arctic Islands are somewhat limited in their options. Those seeking to assess or promote resource development should pursue a coordinated approach that would include: 1) incentives to look for a high-value commodity (in the case of the Arctic Islands, exploration for high-value oil led to discovery of lower-value gas and zinc deposits); 2) generation of new exploration concepts; 3) training of local prospectors; 4) formulation of better ways to evaluate showings to change from a logistic-dominated to a target-dominated discovery process.

### References

- Christensen, J.N., Halliday, A.N., Leigh, K.E., Randell, R.N., & Kesler, S.E., 1995. Direct dating of sulphides by Rb-Sr: A critical test using the Polaris Mississippi-Valley-type Zn-Pb deposit, *Geochimica et Cosmochimica Acta*, v. 59, p. 5191-5197.
- Dewing, K., Sharp, R.J., & Turner, E.C., in press. Synopsis Of the Polaris Zn-Pb-Cu District, Canadian Arctic Islands, Nunavut, *in* Goodfellow, W. and Kjaersgaard, I., eds., *Mineral Resources of Canada: A Synthesis of Major Deposit-types, District Metallogeny, the Evolution of Geological Provinces, and Exploration Methods*. Geological Survey of Canada – Mineral Deposit Division Special Paper, 18 p.

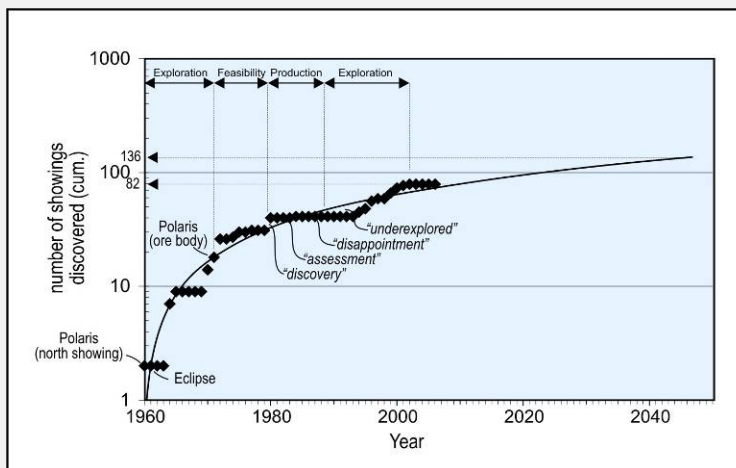


Fig. 3. Discovery curve in the central Arctic Islands Zn-Pb District.

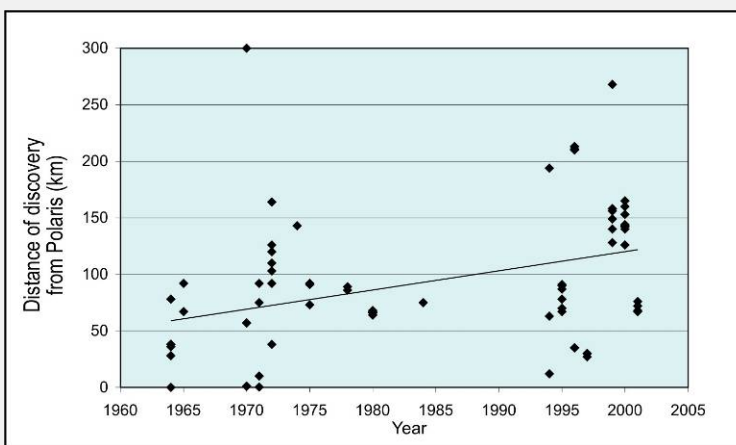
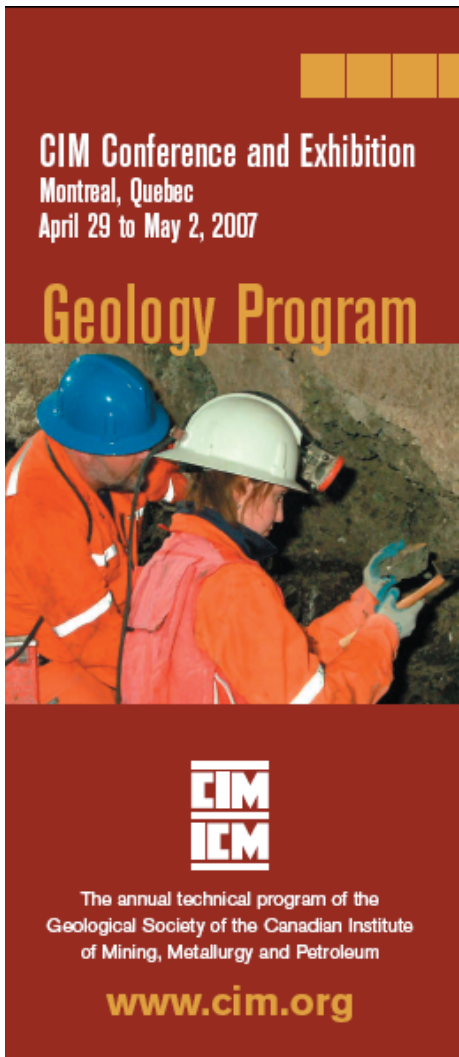


Fig. 4. Distance of discovered showings from Polaris Mine versus year of discovery. There is a general progression from close to far indicating that logistics and economics governed the exploration more than the attractiveness of the geological target.



(Continued from page 5)

- Dewing, K., Sharp, R.J., & Muraro, T., 2006. Exploration history and mineral potential of the central Arctic Zn-Pb district, Nunavut. *Arctic*, 59, p. 415-427.
- Randell, R.N. & Anderson, G.M., 1997. Geology of the Polaris Zn-Pb deposit and surrounding area, Canadian Arctic Archipelago, in Sangster, D.F., ed., Carbonate-hosted lead-zinc deposits, Special Publication - Society of Economic Geologists. v. 4, p. 307-319.
- Savard, M.M., Chi, G., Sami, T., Williams-Jones, A.E., & Leigh, K., 2000. Fluid inclusion and carbon, oxygen, and strontium isotope study of the Polaris Mississippi Valley-type Zn-Pb deposit, Canadian Arctic Archipelago: implications for ore genesis. *Mineralium Deposita*, v. 35, p. 495-510.
- Sharp, R.J., & Dewing, K. 2004, Dolomitization and brecciation at the Mississippi-Valley type Zn-Pb Polaris Mine, central Arctic Islands, Nunavut, in J.J. Packard and G.R. Davies, eds., Dolomites: The Spectrum - Mechanisms, Models, Reservoir Development, Canadian Society of Petroleum Geology Core Conference, 27 pp.



**CIM Conference and Exhibition**  
Montreal, Quebec  
April 29 to May 2, 2007

## Geology Program



The annual technical program of the Geological Society of the Canadian Institute of Mining, Metallurgy and Petroleum

[www.cim.org](http://www.cim.org)

Come to Montreal for the geology program of the CIM Conference and Exhibition, and be updated on some of today's most exciting exploration and mining geology ventures. This comprehensive technology program includes eight sessions, offering over 30 presentations focusing on many emerging and revitalized camps across the country and globally, sharing insights into the hunt for tomorrow's world-class deposit.

The CIM Conference and Exhibition is the place to go for the most comprehensive coverage of Canada's minerals industry. It is the leading event for exploration and mining geology in Canada, bringing together the experts from the field with the top academics and research specialists. The geology content of the technical program is complemented by workshops, field trips, and Canada's premier mining event, the CIM Exhibition. The CIM Conference and Exhibition is one of the few events that brings together professionals from across the minerals industry—from geology, mining, maintenance and engineering, through environmental, human resources, and other business leaders.

Visit [www.cim.org](http://www.cim.org) for more details and to browse abstracts.

### Session Themes Include:

- Ore Reserve Estimation, Models, and Reality
- Geology of Uranium Deposits
- Emerging Mining Camps I: Voisey's Bay (Ni)
- Emerging Gold Mining Camps II: Ungava Region
- Emerging Mining Camps III: Eastern Canada (gold)
- Emerging Mining Camps IV: Otish Mountains Region

(diamonds)

- Archean Gold Deposits
- Advances in Exploration and Mine Geology

PLUS, an Iron Ore Symposium consisting of two sessions:

- Geology of New Deposits and Geology of Existing Mines I
- Geology of New Deposits and Geology of Existing Mines II

### Field trips

Reserve your space early for the field trips, to two of the most active regions in the country. Field trips are held immediately following the conference and offer participants a major learning opportunity, whether they are geologists or mining professionals. Go to [www.cim.org](http://www.cim.org) to find out more.

#### Trip One: Northern Quebec/Abitibi: Raglan and LaRonde\* Operations

Fly to Xstrata Nickel's Raglan nickel/copper operation in the northern tip of the province, then go to Agnico-Eagle's LaRonde operation, Canada's deepest underground mine, where LaRonde II is under construction, below the original ore body.

\*There is an option for a one-day trip to LaRonde only.

#### Trip Two: Northern Ontario: Kidd Creek and Montcalm Operations

Head over to Timmins, Ontario, to visit Xstrata's Kidd Creek (deep underground copper and zinc mine) and Montcalm (first nickel producer in the area) operations.

### More opportunities to expand your knowledge!

The Exploration and Mining Geology Journal (EMG) of the Geological Society of CIM is on-track, with a serious line-up of technical volumes underway. Visit [www.cim.org/geosoc/indexEMG.cfm](http://www.cim.org/geosoc/indexEMG.cfm) to browse the table of contents of the most recently published volumes.

This is a one-of-a-kind highly acclaimed peer-reviewed technical journal focused on real life exploration and mining geology around the world.



*Subscribe now!*

## SYMPOSIUM REVIEW

### Precambrian Evolution and Mineral Deposits of the Canadian and Brazilian Shields: Similarities and Differences

By: Gema Olivo and Nuno Machado

A very interesting symposium on *Precambrian Evolution and Mineral Deposits of the Canadian and Brazilian Shields: Similarities and Differences*, sponsored by the Mineral Deposit Division of the Geological Association of Canada, CAMECO, and the Local Organizing Committee, was held during the GAC-MAC joint meeting in Montreal from May 14 – 16, 2006. It was attended by a number of professionals from academia, government, and industry as well as undergraduate and graduate students from North and South America and elsewhere. The Brazilian and Canadian shields host a variety of world class ore deposits, including greenstone belt-hosted gold, volcanogenic massive sulphide, magmatic nickel-copper sulphide, uranium, iron-formations, iron-oxide copper-gold, rare metals, coloured gemstones, and diamond deposits. The distribution of these deposits varies in the two shields: iron-formations, iron-oxide copper gold, rare metal and coloured gemstone deposits are larger and much more common in Brazilian terranes, whilst magmatic nickel-copper sulphide, volcanogenic massive sulphide and unconformity-associated uranium deposits are found mainly in the Canadian Shield. Diamond deposits occur in both shields but in different settings: in Canada they occur in kimberlites, whereas in Brazil they are found in placers of different ages, from Paleoproterozoic to Recent. The goal of the symposium was to have contributions from researchers investigating the geology and mineral deposits of both shields, emphasizing their similarities and differences. This comparison could in turn highlight the critical factors that led to the genesis of the different types of mineral deposits and the exploration principles resulting in their discovery.

The first section comprised overview talks on the metallogeny and tectonic evolution of the shields, and the invited speakers were C. Valeriano (Universidade Estadual do Rio de Janeiro-UERJ, Brazil), A. Galley (Geological Survey of Canada), L. Lobato (Universidade Federal de Minas Gerais, UFMG, Brazil), and N. Duke (University of Western Ontario, Canada). The complex tectonic history of the Brazilian Shield, which includes the Amazonas, São Francisco, Rio da Plata and São Luis cratonic areas surrounded by Brasiliano-Pan African (Neoproterozoic-Paleozoic) orogenic belts related to the assembly of West Gondwana, was clearly explained by C. Valeriano. He highlighted the importance of the Paleoproterozoic (2.0 Ga), Mesoproterozoic (1.5 and 1.1 Ga), and Neoproterozoic-Paleozoic (0.65-0.45 Ga) orogenic belts in reworking the Archean greenstone belts and granite-gneiss terranes and forming juvenile magmatic arcs that were accreted to the Archean cratonic fragments. L. Lobato reported that in Brazil more than 80% of the precious and base-metal resources and circa 65% of ferrous metals are hosted in Archean cratons and in preserved cratonic areas in orogenic terranes. However, given the extensive reactivation of Archean terrains, the age of the mineralization is often controversial, varying from Archean to Neoproterozoic. Of significance are the world-class greenstone-hosted gold deposits associated with iron-formation and altered sedimentary and volcanic rocks (e.g., Morro Velho, Cuiabá mines) similar to those found in the Canadian Slave craton (e.g., Lupin mine), and the Carajás Fe-oxide-Cu-Au-U-REE-F-(PGE) deposits (e.g. Salobo, Sossego, Igarapé Bahia), which are common in the Amazonian craton but less common in the Canadian Shield. A. Galley presented the metallogenic evolution of the Precambrian by comparing it with the Phanerozoic supercontinent cycles and their relationships to the formation of mineral deposits. He concluded that in the Precambrian, the mineral deposits formed in conditions that evolved from vertical tectonics and associated extension to convergent tectonism resulting from mantle cooling, plate thickening and subduction. N. Duke's contribution focused on Neoarchean metallogeny. While he also advocated an analogy between the Neoarchean cycles and supercontinent cycles, he pointed out that due to higher heat flow and the reducing surface environment the Neoarchean is unique in its mineral endowment, notably the komatiite-hosted nickel sulphide deposits, Algoma-type banded iron-formation, Cu-Zn type volcanic-hosted massive sulphide and orogenic gold deposits.

Herb Helmstaedt (Queen's University, Canada) was invited to open the afternoon section with the theme "Comparison of geotectonic settings of diamond deposits in Brazilian and Canadian Precambrian shields", which

(Continued on page 8)

*(Continued from page 7)*

attracted the attention of a large audience. He highlighted the importance of the preservation of the Mesoproterozoic domains in the formation of primary on-craton diamond deposits in Canada, in contrast to Brazil where most of the diamond production comes from secondary alluvial sources. The known Brazilian kimberlites and related rocks are off-craton, in reworked Archean terrains or hiding under the extensive Neoproterozoic-Paleozoic sedimentary cover. However, he pointed out that in western Minas Gerais and in parts of Rondonia, both in Brazil, where large diamonds are found in alluviums and/or weakly diamondiferous kimberlitic rocks, there is great potential to discover economic primary deposits. This was followed by presentations by L. Ootes (NWT Geoscience Office, Canada) and N. Machado (GEOTOP-UQAM, Canada) and collaborators on ages of detrital zircon in Archean sequences in the Slave and São Francisco cratons. The data from both cratons indicate that the sedimentary rocks formed by erosion of the greenstone belt sequences and old granitic-gneiss basements and their associated felsic intrusions in a tectonic setting of magmatic arcs close to continental blocks or active continental margins.

The second day was devoted to the Proterozoic evolution and mineral deposits with two invited speakers: D. Corrigan (Geological Survey of Canada) and M. Moura (Universidade de Brasília, Brazil). D. Corrigan presented a very comprehensive summary of the Proterozoic evolution of the Canadian Shield, showing evidence that most of the Canadian Shield was assembled as a result of Proterozoic accretionary and collisional tectonics around Archean nuclei from 2.0 Ga to 1.0 Ga ending with the assembly of Rodinia. During this period substantial juvenile belts were formed, Archean crustal fragments were recycled, and the giant Ni-Cu sulphide deposits (e.g., Thompson, Sudbury, and Voisey's Bay) were generated. M. Moura presented the major Proterozoic mineral deposits of Brazil and emphasized the relevance of both Transamazonian (2.2-1.8 Ga) and Brasiliano (650-450 Ma) orogenies in reworking older terranes and generating ore deposits distinct from those of the Canadian Shield. These include the world class Sn-In deposits associated with alkaline in-plate granites (e.g., Pitinga, Goiás, Pará and Rondônia deposits), shear-hosted U deposits (e.g., Lagoa Real), and gemstone deposits in the pegmatite province of Minas Gerais-Bahia. The subsequent talks covered the issues related to the possible links between Brazil and Canada during the Proterozoic based on geochronological, paleomagnetic, and tectonostratigraphic data by D. Evans (Yale University, USA), and S. Pehrsson (Geological Survey of Canada) and collaborators. D. Evans proposed that the São Francisco-Congo was juxtaposed directly against the Franklin margin of Laurentia and the Amazonian craton was positioned next to the Laurentia Cordilleran margin during the formation of Rodinia. S. Pehrsson highlighted the similarities of the major magmatic and tectonic-metamorphic events in the São Francisco and Rae cratons, pointing out that the key difference is the older age of the Rae Paleoproterozoic crust and the juvenile signature of the Transamazonian accreted sequences, and discussed the implications for the formation of their mineral deposits. D. Rios (Universidade da Bahia, Brazil) and C. Valeriano (Universidade Estadual do Rio de Janeiro, Brazil) presented the complex tectonic history of the Serrinha Archean nucleus and Alpinópolis complex, respectively, which preserve some of the oldest basement rocks of the São Francisco craton, showing that these Mesoproterozoic-Neoproterozoic basement rocks were reworked during the Paleoproterozoic Transamazonian orogeny.

The last section comprised talks on the evolution of specific types of ore deposits including Pd-Au deposits hosted in Paleoproterozoic iron-formations in southern São Francisco craton (G. Olivo, Queen's University and collaborators), PGE mineralization associated with the Midcontinent rift of northwestern Ontario (P. Hollings, Lakehead University and collaborators), Cu-Au (Ag-U-Co-Bi) mineralization in Great Bear Magmatic Zone (L. Corriveau, Geological Survey of Canada and collaborators) and Goiás Sn-bearing province, Brazil (M. Moura, Universidade de Brasília and collaborators).

This contribution is only a brief summary of the Symposium and the readers are encouraged to consult the abstracts that can be found on the website [http://gac.esd.mun.ca/GAC\\_2006/search\\_abs/program.htm](http://gac.esd.mun.ca/GAC_2006/search_abs/program.htm). This symposium provided a great opportunity for researchers investigating the tectonic evolution and mineral deposits of both shields to interact and hopefully to nucleate new collaborative projects. The symposium could not have taken place without the financial support of MDD, CAMECO and the Local Organizing Committee. A follow up on the comparison of the metallogeny of Brazil and Canada will take place during the 2<sup>nd</sup> Brazilian Symposium on Metallogeny to be held in Pirenópolis (Goiás), Brazil, in June 17-20, 2007. For more information, contact Prof. Nilson Botelho (nilsonfb@unb.br).



**Yellowknife 2007**

**GAC-MAC / L'AGC-AMC**

**May 23 – 25 / du 23 au 25 mai**

*CANADA'S NORTH...  
ITS CLIMATE, ITS CULTURE,  
ITS MINING HERITAGE, AND ITS FUTURE!*

*LE NORD CANADIEN...  
SON CLIMAT, SA CULTURE,  
SON HÉRITAGE MINIER ET SON FUTURE!*

This is the first time *GAC-MAC* has ever been held north of 60°, and though the climate can be **cold**, the hospitality will be **warm**.

C'est la toute première fois que le congrès de l'*AGC* et de l'*AMC* se tiendra au nord du 60<sup>ième</sup> parallèle, et malgré un climat **froid**, l'hospitalité sera des **plus chaleureuse**.

**Do not miss the opportunity to visit Yellowknife! Register today!**

**Ne manquez pas cette opportunité de visiter Yellowknife ! Inscrivez-vous aujourd'hui !**

**FOR MORE INFORMATION PLEASE VISIT OUR WEBSITE  
POUR PLUS D'INFORMATION, VISITEZ NOTRE SITE INTERNET**  
[www.nwtgeoscience.ca/yellowknife2007](http://www.nwtgeoscience.ca/yellowknife2007)



**Mineralogical  
Association of Canada**  
Association minéralogique  
du Canada

## 2006 GeoSoc Field Conference a Huge Success

**By: Damien J. Duff**  
(GeoSoc Past President)

Just when we thought we couldn't get any better at doing these field conferences Dan Brisbin and his crew of co-organizers in Saskatoon stepped up to the plate and put on an absolutely marvellous event in Saskatoon between September 10 and 14<sup>th</sup>. This event represented a "return to its roots", as it were, for GeoSoc field conferences. The first, in 1991, was also held here.

This year's conference was located at the Radisson Hotel in downtown Saskatoon and the theme- as one might expect in Saskatchewan- had a uranium focus- and was titled: **Uranium: Athabasca Deposits and Analogues**.

The formal part of the meeting kicked off with an Icebreaker Reception on Sunday evening, followed by 2 days of excellent talks, given by some of the best qualified speakers in the uranium exploration and mining business. The conference was divided into four sub-sections over the course of the two days of lectures, with a Monday luncheon speaker, Kevin Sissons, from the Canadian Nuclear Safety Commission also delivering an interesting talk.

As we usually find with our GeoSoc field conferences, there was no problem attracting a large attendance to the event, with 237 delegates registered. The format for these shows lends itself beautifully to providing ample opportunities for networking and other informal gatherings- formal lectures and, of course, field trips. Further, with uranium prices at such high levels, the amount of exploration interest is huge- particularly in the Athabasca Basin- the focus of this event. Some of the largest and highest grade deposits in the world are to be found there.

The opening technical session on Monday entitled, *Geological Settings and Genesis of Uranium Mineralization* provided a sound basis to move onto the lectures after lunch, which were devoted to *Exploration Methods and Applications*. The Tuesday morning session had a distinct Athabasca Basin focus and was entitled, *Athabasca Basin Uranium Deposits*. Possible national and international analogues were discussed in the afternoon session entitled, *Geology of Athabasca Basin Analogues*. Finally, Vlad Sopuck of Cameco did a superb job of summing up the technical sessions, with an interesting (and entertaining) overview of the Uranium business.



2006 Saskatoon Organizing Committee: Back row, left to right: Dave Quirt, Ted Trueman, Darren Klassen, Kevin Ansdell, Phil Olson, Dan Jiricka. Front row, left to right: Kim Mysyk, Caraleigh Currie, Kelly Evans, Dan Brisbin, Tony Williamson, Kristl Hoksbergen; (Absent: John Pearson)

Between formal lectures, delegates had the chance to discuss research projects focused on uranium at the poster session. There were 10 posters on display, which were popular with delegates and, furthermore, gave a great opportunity to students and other researchers alike to mix it up with industry representatives from around the world.

There was a significant overseas interest in this conference, with 27 registrants among the crowd attending from; Argentina; Australia, China, France, Japan, Romania and the United States. In this respect this meeting was one of those with the most "international appeal" of recent GeoSoc field conferences.

An accompanying trade show at these events has become *de rigeur* and 23 exhibitors used the conference to showcase

their wares. The location of the booths, so close to where formal lectures were taking place, provided a number of opportunities over coffee and lunch to allow exhibitors and delegates alike to discuss the latest and greatest in uranium exploration and mining-focused technology.

Four post conference field trips got underway almost immediately after the Saskatoon event had finished. Attendance at all was at or near to capacity according to Dan Brisbin. Registrants had the chance to either visit: the Cigar Lake, McLean and Rabbit Lake-Eagle Point deposits; the McArthur River-Key Lake-Millennium-Moore Lake deposits; the Cluff Lake and Shea Creek deposits or to simply view the extensive mineralized core collection at the La Ronge Core Library.

The GeoSoc executive views these field conferences to be one of the critical elements in providing opportunities for our membership to network with industry colleagues while receiving some very valuable professional upgrading. We will thus endeavour to hold one every 2-3 years or as demand requires. We sincerely congratulate and thank once again Dan Brisbin and his crew at the Saskatoon section and encourage you all to check out these field conferences when you get a chance. They are really not to be missed!



Dan Brisbin (right)- Conference Organizing Committee Chairman- receives a hearty congratulations on a job well done from Damien Duff (GeoSoc Past President!)

## Gordon Research Conferences

### **Geochemistry of Mineral Deposits**

**June 29 - July 4, 2008**

**Il Ciocco**

**Lucca (Barga), Italy**

**Chairs:**

Christoph A. Heinrich & Grigore Simon

**Vice Chair:**

John Muntean

This Gordon conference follows the four-yearly tradition of the GRC in Inorganic Geochemistry, the premier discussion forum of research frontiers in economic geology and ore deposit geochemistry. Our ambition for the upcoming meeting is to again bring together leading industry geoscientists from small and

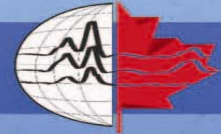
large companies with the wide range of researchers and students working on all aspects of geoscience that are relevant to the formation and distribution of major mineral deposits.

The meeting will be restricted to 100-120 participants, and we invite all interested individuals to contribute ideas to the program. The program is presently in the planning stage and will again focus on new and largely unpublished research, and on major research questions posed by industry.

**Application Deadline:** Applications for this meeting are available online and must be submitted by **June 8, 2008**.

For more information, visit:

<http://www.grc.org/>



*Call for  
Poster Papers*

# 07

## **Exploration07, Toronto, Canada - Sept. 9-12, 2007**

**Call for poster papers: Submission Deadline April 2, 2007**

Next September the Canadian exploration community welcomes the world to Toronto and the Exploration 07 conference on exploration technology. This will be the fifth such decennial event that draws together world leaders in geophysics, geochemistry, remote sensing and data processing and integration to highlight the major advances in their fields over the previous decade.

Exploration 07 will feature an extensive set of oral presentations, poster papers and workshops. A highlight during the meeting will be a 3D theater that will afford delegates the opportunity to experience first hand the marriage of state-of-the-art visualization and data modeling being applied to solve real exploration problems. The world's leading exploration technology providers are being invited to showcase their products and services in the commercial exhibition. The conference proceedings will be provided on DVD to each delegate on-site.

Moving into the new millennium, the mining industry as a whole and the exploration sector in particular, are under significant pressure to achieve predictable and sustainable outcomes. A key facet of achieving this goal will be making the best use possible of exploration technology; this makes Exploration 07 a "must attend" conference for anyone wanting to make a difference in the next decade. Visit [www.exploration07.com](http://www.exploration07.com) for details.

### **NB-CIM Student-Industry Meet & Greet**

On Thursday October 5th, 2006, we had approximately 25 students, and a dozen alumni and friends of UNB Geology (Fredericton, NB) attend the 'CIM Student-Industry Meet & Greet', with NB CIM pitching in pizza and pop. Paul Rennick (NB CIM President 2005-2007) gave a great presentation of the role CIM National ([www.cim.org](http://www.cim.org)) and NB CIM Branch plays in professional development and networking; Paul (NB DNR-Minerals staff) is our alumni, graduating with his B.Sc. in 1982. At the end of the mixer, Andy Cormier (CIM District 1 Chair & NB Coal superintendent for NB Power) announced that NB Coal will donate the popular book 'Gesner's Dream', authored by Gwen Martin (local author & geoscientist), to every student attending this event. NB CIM contributes to the annual NB student geoscience scholarship program (\$2000) of which many of our students have benefited. We are very appreciative of Paul taking the time to share CIM news with us, and also of Prof. David Lentz for organizing the event and making sure the pizzas arrived on time.



# The Geology of Gem Deposits

## MINERALOGICAL ASSOCIATION OF CANADA SHORT COURSE

Short course organizer: Lee Groat, University of British Columbia  
May 21–22, 2007, prior to the GAC-MAC Joint Annual Meeting, Yellowknife, Canada

### Overview



This two-day short course will look at gemstones from a geological perspective. It will precede Yellowknife 2007—the joint annual meeting of the Geological Association of Canada and the Mineralogical Association of Canada, in Yellowknife, Northwest Territories, Canada. It will be a unique opportunity to experience a change of climate and a meeting north of 60°.



A special session on Diamonds: Exploration to Production - A Northern Canada Perspective and a post-conference field trip to the Canadian diamond mines, sponsored by BHP and Diavik, will complement the short course.

Gem deposits are rare because in general the conditions that promote their formation are unusual and thus worthy of scientific study. Recently, modern geological and analytical techniques have been applied to gem occurrences in Canada and elsewhere, and our models and understanding of their formation are being radically altered. This short course will review our current understanding of diamond, ruby, sapphire, and emerald deposits, but will also examine the lesser-known coloured gems.



Photos courtesy of True North Gems Inc.

### The following topics will be covered:

- **Diamonds:** *Thomas Stachel* (University of Alberta)
- **Gem corundum:** *Gaston Giuliani* (IRD et CRPG/CNRS)
- **Gem beryl:** *Lee Groat* (University of British Columbia)
- **Other gems (tsavorite, tanzanite, topaz, etc.):** *Dan Marshall* (Simon Fraser University)
- **Pegmatite gem deposits:** *Skip Simmons* (University of New Orleans)
- **Jade deposits:** *George Harlow* (American Museum of Natural History)
- **Canadian coloured gem occurrences:** *Brad Wilson* (Alpine Gems Ltd.)

Registration fees: **CDN\$425** (professional) and **CDN\$250** (students).  
Attendees must also register for at least one day of the GAC/MAC meeting.



For more information, e-mail Lee Groat at [lgroat@eos.ubc.ca](mailto:lgroat@eos.ubc.ca)  
or the MAC business office ([ptremblay@mineralogicalassociation.ca](mailto:ptremblay@mineralogicalassociation.ca))  
Visit the conference website at [www.nwtgeoscience.ca/Yellowknife2007](http://www.nwtgeoscience.ca/Yellowknife2007)

# Exploration and Mining Geology Special Issue: Volcanic-hosted Massive Sulfide Deposits and their Geological Settings in the Bathurst Mining Camp, New Brunswick

Guest Editor: David R. Lentz

Volume 15, Nos. 3–4, July–October 2006

(Published February 2007)

## Table of Contents:

The Brunswick No. 6 massive sulfide deposit, Bathurst Mining Camp, Northern New Brunswick, Canada: A synopsis of the geology and hydrothermal alteration system

*D.R. Lentz and S.R. McCutcheon*

Chemostratigraphy at the Brunswick No. 6 volcanic-sediment-hosted massive sulfide deposit, New Brunswick: Resolving geometry from drill core in deformed felsic volcanic rocks

*A.O. Wills, D.R. Lentz, and G. Roy*

Petrology, geochemistry, and genesis of the copper zone at the Brunswick No. 6 volcanogenic massive sulfide deposit, Bathurst Mining Camp, New Brunswick, Canada

*K.L. MacClellan, D.R. Lentz, and S.H. McClenaghan*

A Physical volcanological, chemostratigraphic, and petrogenetic analysis of the Little Falls member, Tetagouche Group, Bathurst Mining Camp, New Brunswick

*W.S. Downey, S.R. McCutcheon, and D.R. Lentz*

The Flat Landing Brook Zn-Pb-Ab massive sulfide deposit, Bathurst Mining Camp, New Brunswick, Canada

*J.A. Walker and D.R. Lentz*

The Gold-rich Louvicourt volcanogenic massive sulfide deposit, New Brunswick: A Kuroko analogue in the Bathurst Mining Camp

*S.H. McClenaghan, D.R. Lentz, and C.J. Beaumont-Smith*

The Orvan Brook volcanogenic massive sulfide deposit: Anatomy of a highly attenuated massive sulfide system, Bathurst Mining Camp, New Brunswick

*J.A. Walker, D.R. Lentz, and S.H. McClenaghan*

Litho-geochemistry and hydrothermal alteration at the Halfmile Lake South Deep Zone, a volcanic-hosted massive sulfide deposit, Bathurst Mining Camp, New Brunswick

*L.K. Mireku and C.R. Stanley*

The Camelback Zn-Pb-Cu Deposit: A Recent Discovery in the Bathurst Mining Camp, New Brunswick, Canada

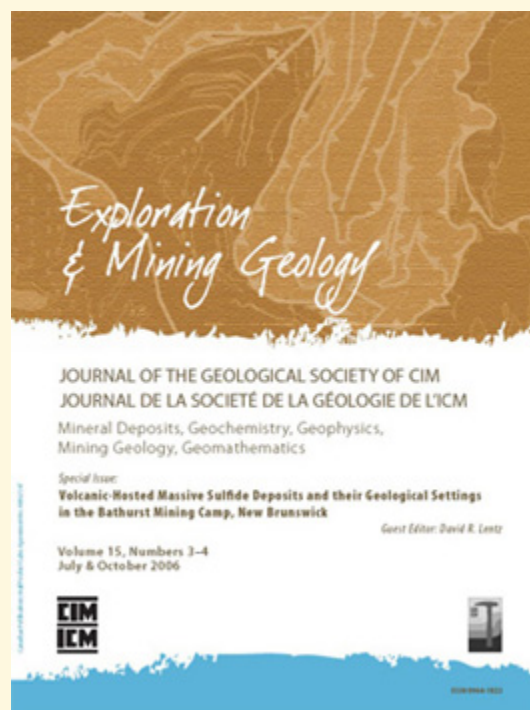
*J.A. Walker and J.I. Carroll*

The Mount Fronsac North volcanogenic massive sulfide deposit: A recent discovery in the Bathurst Mining Camp, New Brunswick

*J.A. Walker and G. Graves*

Chemostratigraphy of volcanic rocks hosting massive sulfide clasts within the Meductic Group, west-central New Brunswick

*S.H. McClenaghan, D.R. Lentz, and L.R. Fyffe*



**NOW AVAILABLE!!**

For more information, visit <http://www.cim.org/geosoc/indexEmg.cfm>



## GAC-MAC AGC-AMC 2007 Short Course

### Application of till and stream sediment heavy mineral and geochemical methods to mineral exploration in western and northern Canada

Mineral exploration in western and northern Canada requires an appreciation and understanding of glacial processes, surficial sediments, and glacial history. This course will focus on the application of indicator mineral and geochemical methods to mineral exploration in glaciated terrain of western and northern Canada. An overview of glacial processes, till and stream sediment sampling techniques, and indicator mineral methods used for diamond, gold and Ni-PGE exploration will be presented. Quality control with indicator mineral sampling and processing will be addressed. Seven case studies will be presented, offering the latest research and results from Canadian geological surveys and from successful drift exploration programs undertaken in Canada by the mineral exploration industry. This short course will be one full day. A published volume is anticipated to result from this short course.

Chairs: Roger Paulen (Alberta Geological Survey) & Isabelle McMartin (Geological Survey of Canada)

#### List of Presenters:

- Ralph Stea (Stea Surficial Geology Services)
- Stu Averill (Overburden Drilling Management)
- David Hozjan (Overburden Drilling Management)
- Ray Lett (British Columbia Geological Survey)
- Glen Prior (Alberta Geological Survey)
- Janet Campbell (Saskatchewan Geological Survey)
- Pam Strand (Shear Minerals Ltd.) Tom McCandless (Ashton Mining of Canada Ltd.)
- Travis Ferbey (BCMEMP, Resource Development and Geoscience Branch)
- Rob Carpenter (Kaminak Gold Corp.)
- Harvey Thorleifson (Minnesota State Survey)
- Isabelle McMartin (Geological Survey of Canada)
- Roger Paulen (Alberta Geological Survey)

## UNB SEG-CIM Student Chapter Workshop

On February 2nd, the University of New Brunswick SEG-CIM Student Chapter Workshop kicked off the first day of the Atlantic Geoscience Society's annual colloquium at the Delta Beauséjour Hotel, in Moncton New Brunswick. Co-chairing the workshop were Dr. David R. Lentz and UNB Masters student Ryan Toole. There was no problem attracting a large crowd to the workshop with 27 students and 27 professionals in attendance. This allowed for a great opportunity for networking and formal lectures. Presenters include Dr. David R. Lentz (UNB), Dr. Reg A. Wilson (NB DNR – Minerals), Dr. Cliff Shaw (UNB), Warna S. Downey (UNB Ph.D candidate), Dr. Steve McCutcheon (NB DNR – Minerals), Alex Wills (UNB Ph.D candidate) and CIM Distinguished Lecturer Dr. Wulf Mueller (UQAC).



**Left:** New Brunswick Department of Natural Resources's Reg A. Wilson describes volcanic rock textures and their importance in understanding volcanic environments and facies.

**Right:** CIM Distinguished Lecturer Wulf Mueller presents his research on Archean Subaqueous Calderas and their significance to Volcanic-hosted massive sulfide exploration.



## MEETINGS, WORKSHOPS, & FIELDTRIPS

### 2007

- **April 29-May 2 - 2007 CIM Conference and Exhibition**, Palais de Congrès de Montréal, Montreal, PQ; contact: jmde-mers@cim.org
- **May 23-25 - GAC/MAC Annual Meeting 2007**, Yellowknife, NWT; [http://www.nwtgeoscience.ca/gac\\_mac](http://www.nwtgeoscience.ca/gac_mac)
- **June 11-June 16 - Tectonics and Metallogeny of the Circum-North Pacific and Eastern Asia**, Khabarovsk, Far East Russia; [http://itig.as.khb.ru/conf/parfenov-2007/parf\\_en\\_00\\_conf\\_2007.html](http://itig.as.khb.ru/conf/parfenov-2007/parf_en_00_conf_2007.html)
- **June 14-19 - 23rd International Applied Geochemistry Symposium (IAGS)**, Oviedo, Spain; <http://www.appliedgeochemists.org/>; contact: jlored@correo.uniovi.es
- **August 20-24 - 9th Biennial SGA Meeting**, Dublin, Ireland; <http://www.e-sga.org/sga.html>
- **September 9-12 - Exploration07**, Fairmont Royal York Hotel, Toronto, ON; <http://www.exploration07.com>; contact: interest@exploration07.com
- **September 24-30 - Ores and orogenesis: Circum-Pacific Tectonics, Geological Evolution, and Ore Deposits**, Tucson, Arizona; <http://www.agssymposium.org/>

### 2008

- **January 28 - 31 - Mineral Exploration Roundup 2008**, The Westin Bayshore, Vancouver, BC; <http://www.amebc.ca>; contact: roundup@amebc.ca
- **May 26 - 28 - GAC/MAC Annual Meeting 2008**, Quebec City, Quebec; <http://quebec2008.net/>
- **June 29 - July 4 - Gordon Research Conference - Geochemistry of Mineral Deposits**, Lucca (Barga), Italy; <http://www.grc.org/>

## Information for Contributors:

The Gangue began as a quarterly publication assembled by the Mineral Deposits Division of GAC, which was distributed to its members in hard copy form. In 2005, MDD and the Geological Society of CIM decided to join forces and jointly publish the Gangue. The Gangue is currently distributed to members of MDD and CIM-GeoSoc as an online publication. The Mineral Deposits Division of the Geological Association of Canada is Canada's foremost society for promoting the study of mineral deposits by supporting local and national meetings, symposia, short courses and field trips. We sponsor the publication of research relating to ore deposits and metallogeny, and recognize the contributions of outstanding Canadian economic geologists by annually awarding the Duncan Derry and William Harvey Gross medals and the Julian Boldy Certificate.

## Publication Schedule:

SUBMISSION	DATE
December 15	January
March 15	April
June 15	July
September 15	October

The objective of this newsletter is primarily to provide a forum for MDD and CIM-Geological Society members and other professionals to voice new ideas, describe interesting mineral occurrences or expand on deposit models. Articles on ore deposits, deposit models, news events, field trips, book reviews, conferences, reprints of pres-

entations to companies, mining groups or conferences, or other material which may be of interest to the economic geology community are welcome. Manuscripts should be submitted by email in WP or WORD format. A printed version should be mailed or FAXed. Illustrations should be camera-ready (ideally as CDR digital files); photos should be of good quality. Short items dealing with news events or meetings can be submitted by FAX, postal mail or email. Contributions may be edited for clarity or brevity.

## For Information & Submissions:

### **Kay Thorne**—THE GANGUE

NB DNR-Minerals  
PO Box 6000, Room 150  
Fredericton, NB E3B 5H1  
Email: Kay.Thorne@gnb.ca  
Tel: (506) 453-2206  
Fax: (506) 453-3671

### **Luke Ootes**—THE GANGUE

Northwest Territories Geoscience Office  
PO Box 1500, 4601-B, 52 Avenue  
Yellowknife, NT X1A 2R3  
Email: luke\_ootes@gov.nt.ca  
Tel: (867) 669-2636  
Fax: (867) 669-2725

