



SGA News

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New mineral deposit model for the Cu-Co-Zn-Ni-Ag-Au sulphide deposits in Outokumpu, Finland

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Introduction

The Outokumpu mining district in eastern Finland is well-known for its Precambrian sulfide deposits with economic grades of Cu, Zn, Co, Ni and Au. The mining history of the district extended from 1910 to 1988 and involved the exploitation of three major deposits (Outokumpu, Vuonos and Luikonlahti) with a total production of c. 50 Mt ore averaging 2.8 % Cu, 1 % Zn and 0.2 % Co together with minor amounts of Ni and Au. More recently, Outokumpu-type ores have gained renewed economic interest, and currently one deposit, Kylylahti, is proceeding into a full bankable feasibility study (www.vulcanresources.com).

Deposit modelling of the Outokumpu-type ores has proven a difficult task. Their unusual and diverse lithological associations, polyphase deformation, medium to high metamorphic grade, and pervasive remobilisation have hampered any straightforward conclusions on the origin of the ore. In the course of over 80 years of research a number of deposit models have been presented for Outokumpu. These include: remobilised magmatic sulfide deposit (Mäkinen 1921, Väyrynen 1939), porphyritic Cu-ore derived from the granites (Trüstedt 1921, Vähätalo 1953), SEDEX

(Ergani-Meggen-Rammelsberg-type; Borchert 1954), remobilised stratiform copper deposit (Saksela 1957) and – more recently – various subtypes of sea floor sulphide (VHMS) deposits (Mäkelä 1974, Koistinen 1981, Papunen 1985, Gaál & Parkkinen, 1993, Loukola-Ruskeeniemi 1999).

In late 1998, a five-year-long joint venture project between the Geological Survey of Finland and Outokumpu Mining Oy was established in order to conduct Cu-Co-Zn-Ni-Au exploration within the classical Outokumpu mining district. The exploration work was backed up by a modelling sub-project, with an ultimate goal to develop an updated mineral deposit model. The modelling work consisted of a review of a large number of drill cores and an extensive study of trace element and Pb isotope characteristics of the Outokumpu-type ores and their host rocks. The outcome of our sub-project – the new mineral deposit model for Outokumpu – is shortly outlined below and in detail in Peltonen et al. (2006).

The new mineral deposit model

Literature survey implied that the Outokumpu type semimassive, polymetallic Cu-Co-Zn-Ni±Au sulphide deposits rep-

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From the SGA President

Hartwig Frimmel

Since you received the last issue of SGA News, a series of new developments took place, some of which I would like to highlight and comment on. After the SGA Council had decided last year to introduce a new award to honour outstanding life-time achievements in the field of economic geology and mineral deposit research, a major step forward in this direction was achieved in the last few months when Newmont Mining Corporation agreed to sponsor this new award for the next 10 years. The medal – to be known as the SGA-Newmont Gold Medal – will consist of 1 ounce of gold, designed by a leading artist from Germany. It will be awarded biannually in recognition of a full career in performance of unusually original work in the mineral deposit sector, which shall be broadly interpreted to encompass major contributions to the science through research and the development of mineral resources through mine geology, exploration and discovery.

Encouragement of students and young researchers in the field of mineral deposit studies has been a major goal of SGA for many years. One expression of this has been the SGA Young Scientist Award. This award, which consists of a citation, prize money and travel to the SGA Biennial Meeting, is offered to a young scientist who contributed significantly to improving our understanding of mineral deposits and who published his/her research results before the author's 35th birthday. Generous sponsorship for this award has now been secured from Barrick Gold Corporation and the award will be known in future as the SGA-Barrick Young Scientist Award.

SGA is very proud and pleased to be associated with our sponsors, Newmont and Barrick, both leading mining and exploration companies. This sponsorship reflects not only a commitment of industry to the geoscience community in general and SGA in particular, but also the importance of encouraging and supporting students and young researchers in the field of economic geology. A further opportunity for expressing such a commitment will be the next SGA Biennial Meeting to be held in Dublin, Ireland, from 20 to 23 August 2007. After the highly successful drive to provide sponsorship for students to attend the last SGA



Hartwig Frimmel

Biennial Meeting in Beijing, we hope and expect to receive again a substantial amount of sponsorship from industry to enable as many students as possible to attend the Dublin Meeting. I therefore call industry to show their commitment to the next generation of economic geologists by providing financial support for our student members, and I call the students to register for the Dublin Meeting and apply for sponsorship. For further details see the conference website (<http://www.conferencepartners.ie/sga2007>).

Coming back to the topic of awards, I urge all of you to think about suitable nominations for both the SGA-Newmont Gold Medal and the SGA-Barrick Young Scientist Award. Every SGA member can nominate candidates (for details on how to nominate go to <http://www.e-sga.org>). The deadline for nominations is 30 March 2007. Council will, after consideration and discussion of each nomination, elect the successful nominees by majority vote. When visiting our website you will immediately notice its brand new, modern design – a recent development that was spearheaded by Georges Beaudoin. To keep the website up-to-date and an effective platform for interaction between the Society, its members and also industry, Council decided to create a new executive position – website editor

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SGA News can be also read in the SGA homepage on Internet:
<http://www.e-sga.org>

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Items for publication may be sent to: SGA News (see address below)
Manuscripts should be sent by e-mail using Microsoft Word for text and Jpeg or Tiff formats for pictures and figures (the latter must be in grey level tones, not colour!). Please always send a paper copy and indicate the format you are using.

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31 May 2007

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– and we are pleased to announce that Georges Beaudoin will fill this position.

With the big events on the SGA Calendar - our biennial meetings - taking place every odd year, one might think that the even years are the dull ones for SGA. This is not the case at all. In 2006 SGA has been involved in a number of activities, such as the XXV Latinamerican Course on Metallogeny, held in June in Antofagasta, Chile, the SGA Gold Short Course in Munich, Germany, and the Fermor Meeting in London, UK. Regretfully, the co-sponsorship of the 12th Quadrennial IAGOD Symposium in Moscow had to be withdrawn after SGA Executive members, including those who were supposed to chair the planned SGA Session at that meeting, had been officially banned by the IAGOD Executive from attending

the meeting in a very surprising and most bizarre way. It remains unclear to which extent this unfortunate decision was supported by IAGOD in general, but it left the SGA Council no other choice but to suspend normal relations with IAGOD for the time being.

All of us within SGA are now looking forward to the next SGA Biennial Meeting, the preparations of which are in full swing. The local organizing committee is working hard to guarantee that this meeting will be a great success. Therefore, make sure you will be part of it – Dublin 2007 promises to be an unforgettable experience. To this effect, visit the conference website – it is being updated regularly as the preparations unfold: <http://www.conferencepartners.ie/sga2007>.

News of the Society

News of the Council

Report of the President – (H. Frimmel)

H. Frimmel highly appreciated great hospitality and smooth arrangements by the Irish Geological Survey and the Local Organizing Committee (LOC). Then he reported on various activities since the last Council meeting (May 6, 2006), including relationship with Springer, closure of the financial books for Beijing 2005 meeting, relationship with IAGOD, future financial support for SGA from industry and others.

Report of the Executive Secretary (J. Pašava)

J. Pašava reported on new memberships from May 5, 2006 to November 1, 2006 and other administrative activities including communication to membership and other institutions and reporting to the IUGS.

Report of the Treasurer (D. Leach)

D. Leach presented the Financial Report for the period to November 3, 2006 with financial strategic plan and development of corporate sponsorship for students participating in the Dublin 2007. It was also emphasized that SGA needs to build up continuous support from industry.

Report of the Chief Editors, MD (B. Lehmann, L. Meinert)

J. Pašava reported on behalf of the Chief Editors. Council greatly appreciated that MD is on track with 8 issues planned to be published by the end of 2006 (MD no.7/vol. 41 was already printed and no. 8/vol. 41 should appear in December 2006). MD keeps its leading position amongst economic geology journals.

Report of the Promotion Manager (G. Borg)

G. Borg informed about the development of a proposal for design of the SGA-NEWMONT Gold Medal. SGA has a chance to create a real unique and artistically outstanding award.

Report of the Chief Editor, SGA News (M. Chiaradia)

Council decided to move deadlines for submission of contributions to SGA News to November 30 and May 31 every year.

Reports of regional VPs

Council highly appreciated very successful activities of C. Holm-

gren in South America and recent promotional efforts of F. Bierlein and R. Herrington. Council also approved that R. Herrington will prepare a proposal for a field training workshop for students for the next Council meeting.

Progress report on the preparation of the 9th SGA Biennial Meetings 2007 (G. Stanley)

Several reports were presented. G. Stanley presented general issues of conference planning and development, preliminary outline programme and deadlines. C. Andrew reported on the progress of technical programme, Kerr Anderson reported on field trips and short courses, E. Doyle presented updated budget. After discussing individual reports Council approved all reports with great thanks.

SGA Awards – SGA-Barrick Young Scientist Award and SGA-Newmont Gold Medal (J. Pašava, H. Frimmel, D. Groves, G. Borg, D. Leach)

J. Pašava presented revised descriptions of both SGA-Barrick Young Scientist Award and newly established SGA-Newmont Gold Medal. Council accepted the change of the name of the first award and deadline for applications for both awards (newly by March 30, 2007).

Proposals for the 10th SGA Biennial Meetings in 2009 (Australia and Chile)

After an extensive discussion SGA Council approved the Australian bid for the 10th SGA Biennial Meeting (2009).

SGA-SRG collaboration update (J. Pašava)

J. Pašava reported on exchange with representatives of the Society for Resource Geology. Both Societies will look for opportunities for closer collaboration in the future.

Report on the modification of SGA website (G. Beaudoin)

J. Pašava presented the report on behalf of G. Beaudoin. The new website was officially introduced to SGA membership on August 30, 2006. Council approved G. Beaudoin to become Chief Editor, SGA website (Council executive position), who also took over website monitoring temporarily done by L. Meinert and B. Lehmann. Council decided to discuss the following issues with Springer: -the change from current external link to SaferPay to seamless integration,

-the website authentication of SGA members for direct access to MD.

Status of SGA-IAGOD collaboration (H. Frimmel, J. Pašava)

H. Frimmel reported on this unfortunate issue and the recent correspondence between SGA and IAGOD. After discussion Council unanimously approved to suspend collaboration with IAGOD.

Past activities

-Conference on the Geology of the Middle East (March 20-23, 2006 Al-Ain, United Arab Emirates)-M.Yazdi

-The XXV Latinamerican Course of Metallogeny (June 6-27, 2006 Antofagasta, Chile) – F. Tornos and C. Holmgren). Council greatly appreciated efforts of C. Holmgren, F. Tornos and their colleagues at the SGA promotion in South America.

-Gold Short Course (June4-7, 2006 Munich, Germany) – Hagemann et al.

-The 12th IAGOD Quadrennial Symposium (August21-24, 2006 Moscow, Russia) – A. Vymazalová, R. Herrington – SGA session cancelled

-The 10th GOLDSCHMIDT 2006 (August 27-September 1, 2006 Australia) – SGA had a booth there – F. Bierlein

-UNESCO/Geochim 2006/SGA – Postgraduate training course in geochemical exploration methods and their environmental applications (September 4-18, 2006 Prague and Dolní Rožinka, Czech Republic) – J. Pašava, D. Mašek - cancelled

-Fermor Meeting (September 13-15, 2006 London, UK) – R. Herrington

-The International meeting « Deuxièmes journées DeLaunay » organized by the Sciences and Techniques Faculty of Marrakech, October 25th and 26th 2006 – D.Leach - SGA keynote speaker (no booth) - cancelled

Future activities

-SGA Gold Short Course (June 2007 Munich, Germany)

-SGA presence at the 2008 IGC (Oslo, Norway) – update by P. Weiher (SGA Representative)

-A joint meeting with the GAC and MAC in 2008 (May, Quebec City, Canada)-update by G. Beaudoin

Invitation to students to participate in the 9th SGA Biennial Meeting – Trinity College Dublin, Ireland, 20th-23rd August, 2007

Anna Vymazalova

We warmly invite students from all over the world to submit abstracts and participate in the 9th SGA Biennial Meeting in Dublin in 2007. The SGA Council has made a strong effort to encourage and support students in order to make your participation both informative and enjoyable. A strong commitment from the SGA to students was shown at the 8th SGA Biennial Meeting in Beijing where almost 100 students attended the meeting, thanks to the generous financial support of corporate sponsors.

There will be no future for economic geology activity and research without the increased involvement of graduate students and researchers in this branch of geology. Your active involvement is considered essential for the success of the meeting.

The information concerning the meeting will be updated on the conference website www.conferencepartners.ie/sga2007. Please keep visiting the website to gain the most up-to-date information for the conference. We also strongly encourage you to return the "Expression of Interest" form in order to receive updates.

There is a possibility of making some funds available for students to participate in the conference. However this is dependent on corporate contributions, which are being sought. A limited number of student grants should be available. A specific application form will be provided on the Website. Student grants will be awarded depending on the acceptance of an abstracts for oral or poster presentation at the conference, and will be based on financial need and scientific relevance of the submitted presentation.

We strongly encourage you to submit extended abstracts and fully integrate in the meeting through presentation of your scientific work in the oral and/or the poster sessions. A presentation will be



Anna Vymazalova

made for best student oral and best student poster presentations authored by students. Details will be provided on the website.

We will also enable students to meet with the corporate sponsors and representatives from mining companies. You will have a unique chance to discuss your future plans with industry geologists from around the world.

Do not hesitate to contact the SGA Student Representative. Your questions, comments and suggestions will be very much welcome. We look forward to meeting you in Dublin in 2007!

The SGA Student Committee

Anna Vymazalova (anvym@cgu.cz)

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LIST OF NEW SGA MEMBERS (MAY 4, 2006-NOVEMBER 1, 2006)

32 Regular Members, 22 Student Members and 1 Senior Member applied for membership from May 4, 2006 to November 1, 2006

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APPLICATIONS to SGA for meeting sponsorship must be submitted to Jan Pasava, SGA Executive Secretary, on appropriate forms available at the SGA home page on Internet: www.e-sga.org

Other requests will be not considered.

Your suggestions and ideas for any topic of interest to SGA are welcome!

They can be addressed to any Council member or to

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Rixenweg 2, D-24147 Klausdorf
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e-mail: TreasurerSGA@aol.com

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Old address _____

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>>> page 1 **New mineral deposit model for the Cu-Co-Zn-Ni-Ag-Au sulphide deposits in Outokumpu, Finland**

represent a distinct and extremely uncommon ore type that is not fully compatible with any of the common sulphide deposit types. The unique features of the Outokumpu-type ore deposits have inspired some workers to propose that Outokumpu type (known as Derni-type in China) should be considered a sulphide deposit type of its own (e.g. Paunonen, 1987). The mineral deposit model for the Outokumpu-type Cu-Co-Zn-Ni-Au deposits should be compatible with the following definitive characteristic:

- Occurrence within an accreted terrain
- Intimate association of the sulphide ores with residual upper mantle peridotites
- Absence of hydrothermal-exhalative sedimentary rocks
- The polymetallic nature of the sulphides: Cu-Co-Zn-Ni-Au-Ag-Cd-Sn-As
- Extremely low Pb (10–50 ppm) abundances (Fig. 2) of the sulphides and their “mantle-like” Pb isotopic signature
- Abnormally high Ni content (500–2000 ppm) of the ore (Fig. 2)
- Syntectonic remobilisation and upgrading of the sulphides

All Outokumpu-type Cu-Co-Zn-Ni-Au-Ag sulphide deposits are intimately associated with ultramafic peridotite massifs that are distributed over an area of more than 5000 km² and that occur in the basal unit of the Outokumpu–Jormua thrust belt in eastern Finland (Fig. 1). Chemical composition of ultramafic massifs imply that their protoliths were exclusively residual mantle peridotites. The available geological, isotope and geochemical evidence attest to an origin of these mafic-ultramafic massifs as ophiolitic fragments from the embryonic ocean basin that was opened west of the present Karelian craton following its break-up ca. 1.97 Ga ago. The rarity of lavas and sheeted dykes in Outokumpu massifs is probably not due to selective preservation, but more likely Outokumpu-type massifs have been derived from dominantly ultramafic sea floor. Lack of pelagic sediments is indicative of a near-continent tectonic setting, where the new oceanic crust became rapidly buried by continent-margin turbidite fans.

The formation of the Outokumpu sulphide deposits started with the deposition of the Cu-rich “proto-ore” in an ultramafic sea floor environment far from any sources

of crustal lead. The scarcity of basalts in the host assemblage, low Pb abundances and “mantle-like” Pb isotope composition strongly suggest that ore deposition occurred within an tectonic setting where ultramafic mantle tectonites were exposed in the seafloor. Heat source for the hydrothermal circulation was provided by high heat flow related to emplacement of high-temperature, low-Ti tholeiitic magmas into the residual mantle peridotites. These magmas crystallised as gabbro and plagiogranite stocks that yield U-Pb zircon ages close to 1950 Ma. The Pb isotope analyses on whole rock and galena samples from Outokumpu and Vuonos ores plot along the 1950 Ma reference isochron suggesting common source of lead for a large volume of ore. This Pb reference isochron also approximately “dates” the primary deposition of the Cu-rich proto-ore, interpretation supported by equal U-Pb zircon ages yielded by the gabbros and plagiogranites. Close modern analogues to the proto-ore setting include e.g. Logatchev and Rainbow fields at the Mid-Atlantic Ridge, where venting of high-T – low-pH fluid resulted in accumulations of Cu-Zn-Au sulphides on serpentinised ultramafic seafloor (Bogdanov et al., 1997; Murphy & Meyer, 1998; Douville et al., 2002). However, Ni- and Co-rich composition of Outokumpu sulphide ores calls for a separate source for these metals.

The present tectonic setting of the Outokumpu ores requires that subsequent to the initial ore formation, fragments of the ultramafic seafloor together with the Cu-rich proto-ores became tectonically incorporated among the turbidite fan sediments and obducted onto the margin of the Archean Karelian craton. Concomitant with, or soon after the obduction, the margins of the ultramafic massif became silicified and carbonated. Due to this alteration, nickel was released from the primary Fe-Mg silicates and re-deposited as Ni-rich sulphides in the alteration fringes of the massifs. These metasomatic quartz rocks and carbonate rocks (previously interpreted as exhalative-sedimentary cherts and carbonates) define a lead isotope isochron of 1908 ± 25 Ma that determines the timing of the formation of the Ni-disseminations, which thus postdates that of the Cu-rich proto-ore by as much as 40 Ma.

The origin of the present polymetallic The origin of the present polymetallic Outokumpu-type Cu-Co-Zn-Ni±Au sulphide deposits is now re-interpreted to be polygenetic.

We propose that syntectonic remobilisation of sulphides caused mixing of these two, genetically unrelated, “endmember” sulphides, i.e. the primary ~1950 Ma old Cu-rich sea floor sulphides (Cu proto-ore) and the secondary, ~1910 Ma old early tectonic Ni-sulphide disseminations (Ni proto-ore), and resulted in the uncommon metal combination of the Outokumpu-type sulphides. The mixing of the end-member sulphides is thought to have occurred by syntectonic fluid-assisted liquid-state remobilisation of the Cu proto-ore sulphides during their emplacement into Ni-disseminations-bearing quartz-carbonate rocks. The final stages of the remobilisation ended up to a strictly structurally controlled final emplacement of the mixed Cu- and Ni proto-ore materials to form the massive-semimassive sulphide-quartz ore sheets. This remobilization was accompanied by duplexing of the ore by isoclinal folding which upgraded the sulphides into economic deposits.

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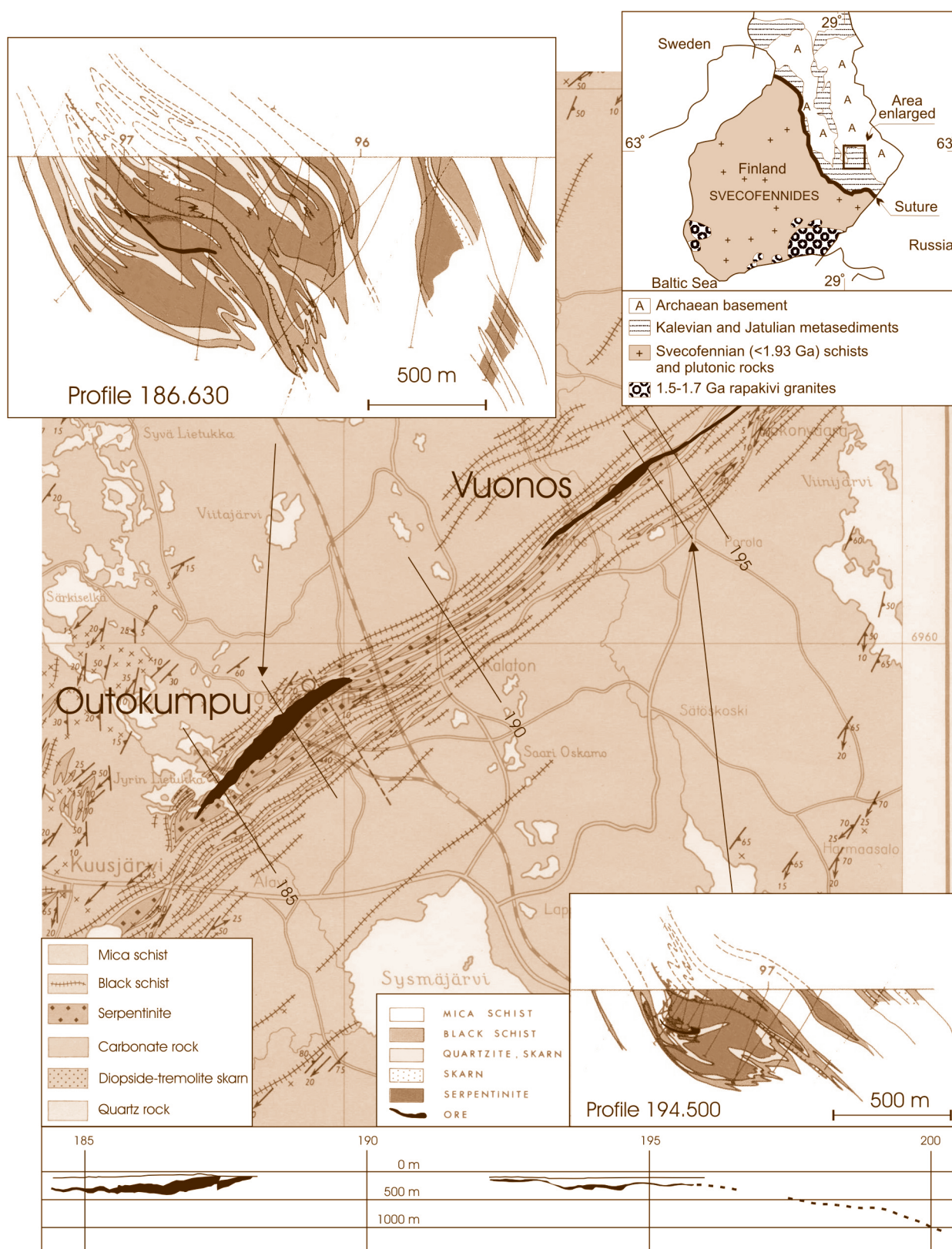


Figure 1: Geological map of the Outokumpu-Vuonos-Perttilahti ore belt. The main map shows the surface projections of the known ore bodies (in black). The longitudinal projections of the ore bodies are given in the lowermost diagram. The two inset diagrams provide cross-sections over the thickest parts of the Outokumpu and Vuonos ultramafic serpentinite massifs.

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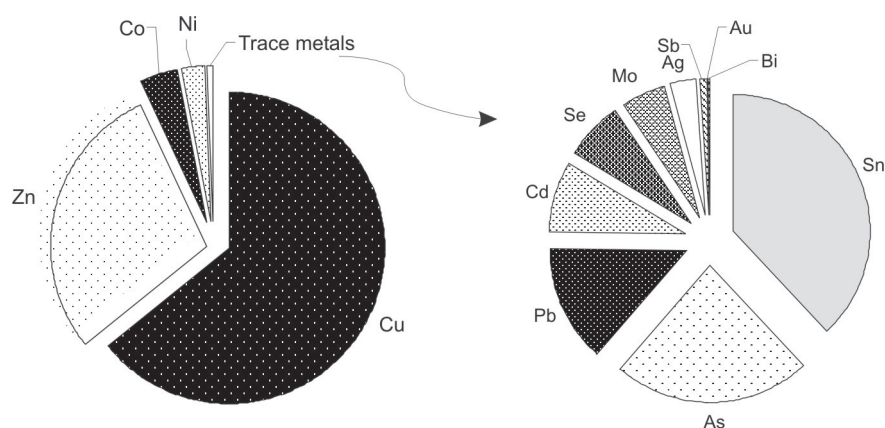
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Relative metal abundances in Outokumpu sulphides...



...and in average MOR (sediment-free) massive sulphides

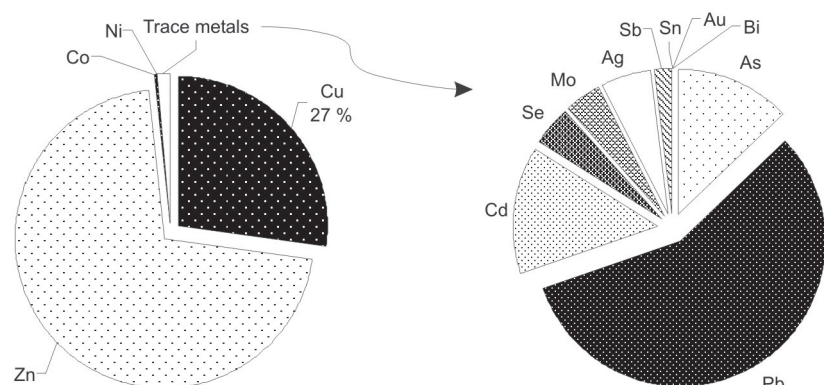


Figure 2: Relative metal and trace metal abundances in Outokumpu sulphide deposit compared to sulphide composition of typical mid-ocean ridge (sediment-free) massive sulphides (Herzig et al. 1998, Goodfellow et al. 1999).

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reer and documents both SGA's and Barrick's commitment to the active support of active young academics.

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The SGA-NEWMONT Gold Medal was established in 2006 to be awarded biannually primarily in recognition of a full career in performance of "unusually original work in the mineral deposit sector, which shall be broadly interpreted to encompass major contributions to (1) the science through research and (2) the development of mineral resources through mine geology, exploration and discovery. The award consists of a citation, pure gold medal, and travel to the Biennial meeting for the presentation.

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To ensure consideration by the SGA Council, please use the "Award Nomination Form" printed in the SGA Newsletter or the downloadable form on the SGA website (www.e-sga.org). If a form is not available, then please include the following:

1. Name of candidate; 2. Address of candidate; 3. A brief summary of candidate's education (academic record); 4. Previous significant awards; 5. A brief summary of significant accomplishments/publications honours that show the candidate's preeminence

in the field of economic geology and/or mineral deposit research (for accomplishments, give specific examples; for publications list no more than 5 titles). Publication lists are considered to be only one measure of contributions to economic geology; many industry-associated individuals are not in a position to publish because of the proprietary nature of their work; 6. Name of person making nomination; 7. Address of person making nomination; 8. Names of three supporters that will be writing letters of support.

Candidates representing each of the three components of SGA membership-- industry, government, and academia-- are solicited. Members of the Society are urged to participate in this important process by nominating outstanding candidates for this prestigious honor. A nomination **MUST BE SUPPORTED** by signed letters from three SGA Members. Supporting letters may be attached to the nomination form or sent separately to the SGA Executive Secretary. The deadline for receipt of the nominations by the Committee is March 30, 2007. Nominations and supporting letters should be sent to the SGA Executive Secretary, Dr. Jan Pasava (see page).

SGA-Barrick Young Scientist Award

The SGA-BARRICK Young Scientist Award is offered biannually to a young scientist who contributed significantly to the understanding of mineral deposits. The award which consists of a citation, prize money of EUR 1500, and travel to the Biennial meeting for the presentation, is not restricted to the candidate's nationality, place of employment, or membership in the Society. The award is given for contributions to economic geology. The SGA-BARRICK Young Scientist Award is awarded for research in economic geology published before the author's 35th birthday. The awardee must be less than 37 years of age on January 1 of the year in which the award is presented. Any Society member in good standing may nominate candidates for the award. Nominees who are not selected in their first year of nomination, but are still eligible will be considered for awards in following years.

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A brief biographical summary in the style of American Men and Women of Science or other similar biographical listing should be submitted by the person making the nomination to the SGA Executive Secretary by March 30, 2007. The following information should be included:

1. Name of nominee; 2. Date of birth; 3. Education (degrees, institutions, dates) and previous awards; 4. Past and present professional affiliations; 5. Reference citation(s) to publication(s) for which the award is to be made, and to other published works. Indicate critical paper(s) and provide a copy of the most outstanding contribution(s), if possible. An individual's contribution in co-authored papers is difficult to evaluate; such papers should be avoided unless the nominee is a senior author whose contributions can be clearly identified; 6. Brief statement explaining the significance of the research, including its pertinence to economic geology, its demonstrated effects, the originality and creativity shown in the research, the clarity of presentation, and its impact on scientific theory or technology; 7. Additional pertinent or related scientific contributions such as other accomplishments, advisory or consultant activities, and recognition of research stature elsewhere by others; 8. Names of individual making the nomination.

Supporting letters are helpful and may be attached to the letter of nomination or sent separately to the Chair of the SGA Young Scientist Award Committee (see page).

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BIOGRAPHICAL INFORMATION (use separate sheet and format style in American Men and Women of Science, Who's Who in America, or similar biographical listing: SGA record available from the SGA Office)

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ADDRESS:
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DATE: SIGNATURE:

LETTERS OF SUPPORT WILL BE SUBMITTED BY:

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2.

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Society of Geology Applied to Mineral Deposits
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Klárov 131/3

118 21 Praha 1, Czech Republic
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SIGNIFICANT ACCOMPLISHMENTS/PUBLICATIONS: (for accomplishments, give specific examples; for publications, list no more than 5 titles: use separate sheet)

Individual nominations for any of these awards MUST BE SUPPORTED by three signed letters from SGA Members. The letters may be attached to this form or sent separately. Supporting letters should emphasize the significance of the nominee's contributions. All information must be verifiable.

NAME OF PERSON MAKING THE NOMINATION:

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Society of Geology Applied to Mineral Deposits

Czech Geological Survey

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Tel. ++420-2-51085506, Fax ++420-2-51818748

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DEADLINE 30 MARCH 2007



In memoriam: G. Christian Amstutz (November 27, 1922 – June 23, 2005)

Lluís Fontboté (Geneva) and Francis Saupe (Méréville)

Professor Dr. h.c. mult G. Christian Amstutz, a personality key in the history of the Society for Geology Applied to Mineral Deposits (SGA), died on June 23, 2005 in his home in Sigriswill, Switzerland, at the age of 82 (*). He had received numerous distinctions including several Doctor and Professor honoris causa awards. He was honorary member of SGA.

SGA is strongly indebted to Christian Amstutz. He had, together with A. Bernard, K.C. Dunham, P. Evrard, E. Grip, G.L. Krol, J. Lombard, I. de Magnée, A. Maucher, P. Routhier and P. Zuffardi, a central role in the foundation of the Society. It was at his office at the University of Heidelberg, where, on June 19-20th, 1965, the Provisional SGA Executive Committee was formed (Fig. 1). He became also the first Chief Editor of *Mineralium Deposita*, the scientific journal launched by SGA in 1966.

Christian Amstutz was born in 1922 in Vorderfultigen, a village in the Swiss Alps close to Bern as the son of a couple of school teachers. After secondary school in Bern, he studied at the ETH of Zurich, where he obtained a Ph.D. in Petrology with Prof. Paul Niggli on Permian alkaline volcanic rocks in the Alps.

He spent three post doc years in USA (Seattle and Boston). In 1952, he moved to Peru to head the Mineralogy Laboratory of the Cerro de Pasco Corporation in La Oroya. There, working for the company that dominated at that time the exploration and mining business in Peru, he spent four years that were critical for his later professional career. Theoretically, his task was to assist the staff of the Cerro de Pasco Corporation in mineralogical and metallurgical problems but, owing the strong scientific curiosity, which characterized Christian Amstutz all along his life, he used this opportunity to work and publish on a large range of topics, which included not only mineralogy, petrology, and metallogeny, but also metallurgy, gemmology, tectonics, geomorphology, and paleoclimatology. Even paleontologic and botanic publications arose from this period.

He and his students largely profited from this “Peruvian epoch”, not only by the development of research topics, but very importantly through personal contacts with colleagues from industry.

In 1956, he was appointed Professor of Economic Geology at the University of Rolla, Missouri, then Missouri School of Mines. There, he proposed a controversial early to late diagenetic genetic model for Mississippi Valley-type deposits (e.g., Amstutz et al., 1958, 1964). In these years he published the article “Syngensis and epigenesis in petrography and ore deposits” (1958-1961), work which had a large influence in the metallogenic world of the sixties and seventies, as well as innovative papers on many other subjects. These include one of the first publications on lead isotopes (1957) in ores of South America, but also papers on Liesegang rings (1958), structural features of the Moon (1961), crystalphysics (e.g. 1964), discussion of impact theories (1965), history of the Sciences (1965), or symmetry in nature and art (1966) to name only a few examples.

In 1962 Christian Amstutz was called as Director of the prestigious Mineralogic-Petrological Institute at the University of Heidelberg, as the successor of the legendary Paul Ramdohr (1890-1985). With enthusiastic engagement he built one of the strongest groups on Economic Geology in Europe. Many dozens of students from all continents obtained their Master (Diplom) and Doctor degrees under his supervision on a variety of subjects, mainly but not only, in Economic Geology. As noted above, it was in Heidelberg where he and Paul Ramdohr invited other colleagues to found SGA and *Mineralium Deposita*, with the declared aim to create a truly international counterpart to the - at that time - strongly USA-centered journal *Economic Geology*. As a sign of openness in a time when English was not yet the lingua franca it has become nowadays, also articles in German and French were accepted in *Mineralium Deposita*, something that did not cause any

problem to the polyglot Christian Amstutz. Thus, the first issue of *Mineralium Deposita* included 26 contributions in three languages of authors from 12 countries from Western and Eastern Europe, North America, Australia, and Africa.

Christian Amstutz wrote numerous articles and edited several books. The classical books “*Sedimentology and Ore Genesis*” edited by G.C. Amstutz in 1964 and “*Ores in Sediments*”, edited together with A.J. Bernard in 1973, as well as the chapter by Amstutz and Bubenicek entitled “*Diagenesis in sedimentary mineral deposits*” in the book “*Diagenesis in Sediments*” edited by Larsen and Chillingar in 1967, illustrate the strong impulse given by Amstutz to the study of ores in sedimentary rocks, certainly one of the most innovative aspects of his career. Concepts such as facies analysis, paleogeography, diagenesis, and basin evolution had to be slowly introduced into the world of ore deposits, which for a long time had been mainly interested in “hard rocks” and magmatic processes. Christian Amstutz, as a teacher, as an author and editor, contributed decisively to the change of the perspective in the study of ores hosted in sedimentary rocks, and particularly of those of base metals. Other books edited by him include “*Glossary of Mining Geology*” (1971), “*Ore Genesis - the State of the Art*” (1982), “*Process Mineralogy of ceramic materials*” (1984), “*Stratabound ore deposits in the Andes*” (1990).

Christian Amstutz was a person with very broad interests, largeley beyond Metallogeny and Earth Sciences. They included Philosophy, Psychology, History, Literature, and Music. These interests had a significant influence on his scientific attitude. So, one of his favorite topics was to trace the “relationships between the general cultural trends and the evolution of thoughts in ore genesis” (Fig. 2). He liked to point out that consciously or subconsciously preconceived hypotheses had a strong influence on scientific theories and he considered some of the

epigenetic interpretations of ore deposits as the result of cultural patterns of thought. He claimed that the scientist should critically take into account and filter the “thought archetypes” inherent to any culture, and try to construct clean working hypotheses essentially based on a combination of geometric (particularly cross-cutting relationships) and geochemical observations of ore and host rock at several observation scales, a statement with which most metallogenists would agree.

Reconsideration of Christian Amstutz work, and specially of the syngenetic interpretation he proposed for several sediment- and volcanic-hosted ore deposits, may lead to think that it is a paradox of human being, that one can be the victim of the errors that one is precisely fighting. We would like to end this obituary with the quotation he used in the opening article of the first issue of *Mineralium Deposita*, quote that best summarizes the main message he delivered to his numerous students:

“For the purpose of research is not to imagine that one possesses the theory which alone is right, but, doubting all theories, to approach gradually nearer to truth. (G.G. Jung, 1959, *Basic Writings*, Modern Library, p. 379)

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Zdenek Johan celebrated his 70th birthday and received the Charles University Gold Medal

Prof. Dr. Zdeněk Pertold, SGA member
Charles University, Prague, Czech Republic

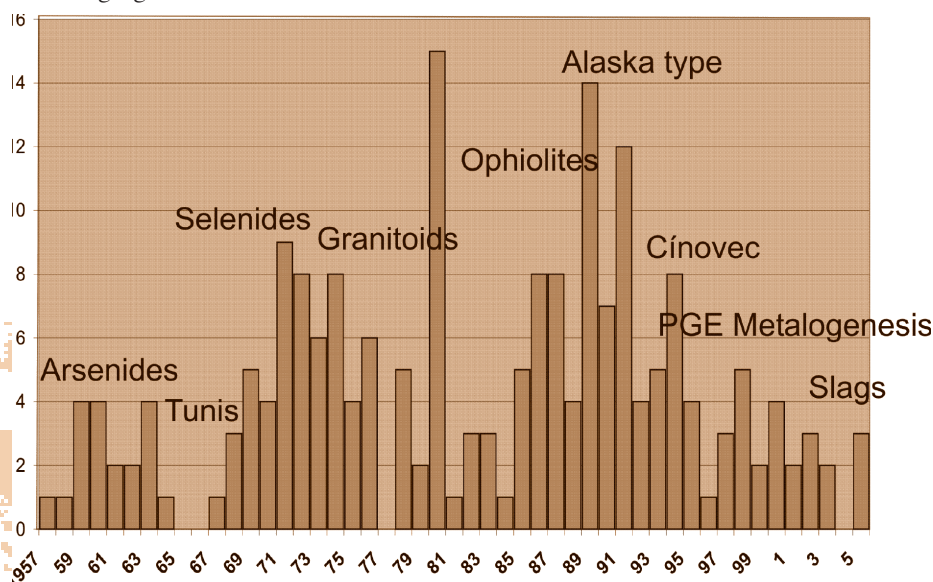
Zdenek Johan – the former SGA President, celebrated his 70th birthday at his Alma Mater in Prague. A seminar in his honour was held at the Institute of Geochemistry, Mineralogy and Mineral Resources, where he has been an external member for the last fifteen years. SGA congratulated to Zdenek Johan through Jan Pašava (SGA Executive Secretary) who participated in this important event.

Zdenek, a gifted sportsman and pianist, graduated from Charles University, defending a thesis on the “Mineralogy and metallogeny of the Cerny Dul deposit, Giant Mountains” (1957). He received his Ph.D. with the dissertation “Mineralogical and physical-chemical study of the binary Cu-As system” (1965).

Since that time he has published more than 200 papers on many topics. The variety of their subjects and the frequency from 1957 to 2005 is shown schematically in the following figure:



The Charles University rector Ivan Wilhelm awarding the gold medal to Zdenek Johan.



Zdenek described and participated in the description of the unbelievable number of 33 new mineral species. He also changed our understanding of geological processes in several respects. I would especially like to mention the role of fluids and metasomatism in the upper mantle and in the processes forming PGE and Cr deposits. He co-operated in this work with David

H. Watkinson (Carleton U., Ottawa). The methods employed in Zdenek's studies extend from structural crystallography to geological mapping. His 28 students defending their theses successfully.

Zdenek Johan's leading role was recognised in B.R.G.M. (Orléans), where he continued his carrier after the occupation of Czechoslovakia in 1968. He became the director of the B.R.G.M.-CNRS group

“Fundamental and applied metallogeny” and was later director of the CNRS “Centre de recherches sur la synthèse et la chimie des minéraux” for 12 years. After his return to B.R.G.M. he served as research director and inspector general until 2000.

His research results led several national geological societies and international organisations to use his expertise, his open and friendly nature and readiness to co-operate (amongst others IUGS, International Mineralogical Association, UNESCO, IAGOD.) He served as President of our Society of Geology Applied to Mineral Deposits in 1993-1997.

Among many distinctions awarded to Zdenek Johan, he became a Cavalier in the French National Order of Merit, Cavalier in the French National Order of “Palmes Académiques”, and corresponding member of the French Academy of Science. His full and happy integration into French life has been accentuated by acting in the role of mayor in Isdes (Loiret), where he lives with his wife Vera.

The Rector Magnificus, Ivan Wilhelm, awarded the gold medal of Charles University to Zdenek Johan during the session

of the University Scientific Council on October 27th, 2005 in the historical Karolinum building. "To recognise fundamental achievements in the knowledge of minerals and of the conditions of their origin related

to major geological systems, and in recognition of the support he has extended to the Czech geological community".

We have been fortunate to be able to enjoy Zdenek's scientific results and his

friendly temperament. On behalf of SGA we would like to wish him many more achievements in the geosciences, and good luck in gardening, music and in finding more interesting paintings.

In memoriam: Wolfgang Engel (1940-2006)

Larry Meinert

Northampton, MA USA

Bernd Lehmann

Clausthal, Germany

Massimo Chiaradia

Geneva, Switzerland

SGA lost one of its best friends and loyal supporters upon the May 5, 2006 death of Dr. Wolfgang Engel, senior editor of geosciences at the Springer publication house. Wolfgang's success in the geoscientific publishing business flowed naturally from his deep love of geology. Wolfgang was born 14 November, 1940 and completed his geology study in Göttingen, Germany. His Ph.D. dissertation was entitled "Kalk-Turbidite im Flysch des Beckens von Ajdovscina in Slowenien zwischen Karst und Julischen Alpen". Following his field

geological career Wolfgang came to the Springer science publishing house in 1984 and built a diverse portfolio of geoscientific publications including SGA's flagship publication, *Mineralium Deposita*, and more recently the SGA newsletter.

In addition to his strong support of SGA and its publications, Wolfgang was an enthusiastic lover of life. His passions included tennis, soccer, good wine, and most of all, his lovely wife Hella who still resides in Heidelberg. The past and present editors of



Wolfgang Engel

SGA publications and all past and present officers of SGA will forever remember Wolfgang Engel as a dear friend and stalwart supporter of SGA.

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

PhD opportunities: fluids and mineral deposits research in Switzerland

Three new PhD projects are expected to start in 2007, combining geological field work, fluid-inclusion and isotope geochemistry, and advanced numerical modelling of ore-forming hydrothermal processes — in variable proportions subject to the candidates' interests.

Two of these projects will focus on the Bingham porphyry-Cu-Mo-Au system, in collaboration with Kennecott geoscientists. One PhD project will develop and apply fluid-inclusion microanalysis, including sulfur as a key element in ore formation, to study the late-stage fluid evolution in porphyries in relation to associated epithermal gold mineralization. The second PhD student will build the first-ever numerical model of high-temperature fluid flow during porphyry-copper ore formation, integrating public and proprietary information from the entire Bingham system, to simulate the fundamental controls on ore grade distribution in magmatic-hydrothermal systems. A third will study the large-scale tectonomagmatic and geochronologic evolution of the Cretaceous porphyry belt of Serbia and Bulgaria.

Please visit <http://proto-igmr.ethz.ch/> for further information about these 3-4 year funded projects and our current research, and apply by email to christoph.heinrich@erdw.ethz.ch with your CV and research interest statement.

\$150,000 AVAILABLE FOR STUDENT RESEARCH GRANTS IN 2007 from the Society of Economic Geologists Foundation, Inc.

More than US\$150,000 will be available from the SEG Foundation and the SEG Canada Foundation for Student Grants in 2007. These grants provide support for graduate student research projects leading to Master's or Doctoral degrees, and for exceptional BS Honors or "BS Titulo" projects. Individual grants typically range up to US\$5,000, although up to \$10,000 may be awarded for particularly meritorious projects. Students in mineral resource study programs throughout the world are eligible and encouraged to apply. Application forms may be down-loaded from the SEG website:

<http://www.segweb.org/GrantApp07.pdf>

and may be submitted for any one of the awards, but will be considered for all awards. Applications must be postmarked no later than February 1, 2007. Awards will be announced by April 30, 2007.

Hugh E. McKinstry Fund. \$100,000 will be available from this Fund to support "study, research and teaching of the science of economic geology or for related projects," including field or laboratory research by graduate students or geologists on study-leave from their employment.

Hickok-Radford Fund. One or two grants ranging up to \$10,000 will be awarded to support field-based research and directly related laboratory studies as applied to metallic mineral deposits, with preference given to projects located in Alaska, northern Canada and other regions north of Latitude 60 North, or for projects at very high elevations elsewhere and extreme southern latitudes. Applicants must be enrolled in a full-time program of study at a degree-granting university or college. Consideration will be given to an applicant's record of leadership and extracurricular activities, including athletics.

Newmont Mining Corporation Grants. \$15,000 will be available to support research projects worldwide related to the geology, mineralization and metallogeny of gold deposits. Emphasis is placed on research with a strong field component, with funds available for directly related laboratory work. Several individual grants of \$3,000 to \$5,000 each will be made.

Hugh Dummett Mineral Discovery Fund. Up to \$5,000 will be available to support

applied economic geology research, including the development of new exploration technology and techniques, and the dissemination of related results through publications, lectures, short courses, workshops and conferences.

Alberto Terrones L. Fund. \$10,000 will be available to provide financial support to one or two qualifying students from Mexico, Peru, and other Latin American countries to pursue graduate studies leading to an MS or PhD degree at universities in the U.S. or Canada. The grants may be used for tuition costs, university fees, to support thesis research, or for any other bona fide expense directly related to pursuing a graduate study program in applied economic geology or geological engineering while regularly enrolled as a graduate student at an MS or PhD degree-granting university.

Timothy Nutt Memorial Fund. Grants from this fund will range up to \$1,000 to provide financial support for geology students and young economic geologists located in Zimbabwe or in Southern Africa with ties to Zimbabwe. The fund may be used to support SEG student chapter activities, travel to meetings, field trips and for research or study grants, technical lectures or any other activities approved by the SEG Regional Vice President for Africa.

Society of Economic Geologists Canada Foundation Fund. A total of C\$50,000 will be available from this fund to support research studies by Canadian or non-Canadian students on mineral deposits or districts in Canada; non-Canadian projects at Canadian universities; non-Canadian students studying at Ca-

nadian universities, or Canadian students doing research at foreign universities.

How to Apply: Awards are intended to fund specific expenses related to student research projects leading to the aforementioned degrees or courses of study. The awards are competitive and based primarily on project merit. Applicants must describe what the project is, why the research is important and how it is to be done, and include an appropriate estimate of expenses that will be incurred on the project. Applicants requesting financial support for non-research expenses from the Alberto Terrones L. Fund must include a statement describing the need and purposes of such request. For further information contact:

Chairman
SEG Student Research Grants
7811 Shaffer Parkway
Littleton, CO 80127-3732 USA
Tel: +1.720.981.7204
Fax: +1.720.981.7874
E-mail: seg@segweb.org



uOttawa



Laurentian University
Université Laurentienne

University of Ottawa / Laurentian University
Joint Modular Course in

Hydrothermal Ore Deposits

February 17-24, 2007, Ottawa

☐ Geochemistry of Hydrothermal Processes Related to Ore Deposits

Jeffrey Hedenquist, February 17 & 18 (Sat-Sun)

☐ Fluid Reservoirs in Complex Ore-Forming Hydrothermal Systems

Daniel Kontak, February 19 & 20 (Mon-Tues)

☐ Submarine Hydrothermal Systems and VMS Deposits

Mark Hannington, February 21 & 22 (Wed-Thurs)

☐ Metasomatic Processes and Exploration for Skarn Deposits

Larry Meinert, February 23 & 24 (Fri-Sat)

Fee: \$250 per session for professionals (\$300 after January 1, 2007)
\$25 per session for students (late fee \$50)

Includes lunches, reception, and course notes. 3 credits applicable toward graduate programs/professional development requirements. Registration begins October 15, 2006. Contact icsr@uottawa.ca

>>> FORTHCOMING EVENTS <<<

* marks a new entry

2007

***February 20-24**

JOINT MODULAR COURSE IN HYDROTHERMAL ORE DEPOSITS, by the University of Ottawa and Laurentian University, Ottawa, Ontario, Canada - Contact: icsr@uottawa.ca. The course will feature four 2-day modules by Jeffrey Hedenquist, Daniel Kontak, Mark Hannington, and Larry Meinert. Open to professionals in industry and graduate students.

***February 24-28**

SECOND INTERNATIONAL CONFERENCE ON GEO-RESOURCES IN THE MIDDLE EAST AND NORTH AFRICA (GRMENA-2), Cairo, Egypt - Contact address: www.grmena.com.eg. Themes of the Conference are: Oil and Gas Resources, Water Resources and environment, Mineral Resources, Application of Remote Sensing in all Fields of Earth Sciences.

***March 27-28**

INTERNATIONAL INDUSTRIAL EXHIBITION OF EQUIPMENT AND TECHNOLOGIES FOR MINING AND PROCESSING OF MINERAL RESOURCES: "SIBMINING - 2007", Novosibirsk, Russia - Contact address: International Exhibition Centre, The Siberian Fair, 220/10 Krasny Prospekt, Novosibirsk, 630049, Russia; phone +7(383)210-62-90, +7(383)210-62-98; Fax +7(383)225-98-45; E-mail mesh@sibfair.ru; website: http://www.sibfair.ru

***April 15-20**

EUROPEAN GEOSCIENCES UNION, General Assembly 2007, Vienna, Austria - Contact address: http://meetings.copernicus.org/egu2007/

***April 29-May 2**

THE CANADIAN INSTITUTE OF MINING, METALLURGY AND PETROLEUM, CIM Conference and Exhibition, Montréal, Canada - Contact address: Jean-Marc Demers, phone +1-514-939-2710; website: www.cim.org

***May 22-25**

AGU, The 2007 Joint Assembly Meeting, Acapulco, Mexico - Contact address: http://www.agu.org/meetings/ja07/

***May 23-27**

GEOLOGICAL ASSOCIATION OF CANADA AND THE MINERALOGICAL ASSOCIATION OF CANADA (GAC/MAC 2007), Annual Meeting, Ellowknife, NWT, Canada - Contact address: http://www.nwtgeoscience.ca/gac_mac/

***May 27-31**

IMWA SYMPOSIUM: WATER IN MINING ENVIRONMENTS, Cagliari, Sardinia, Italy - Contact address: (Rosa Cidu, University of Cagliari, Department of Earth Sciences, via Trentino 51, I-09127 Cagliari, Italy; phone +39 070 6757724; fax +39 070 282236; e-mail: cidur@unica.it

***May 30-31**

FOURTH INTERNATIONAL SYMPOSIUM HIGH PERFORMANCE MINE PRODUCTION, AIMS Aachen International Mining Symposium, Aachen, Germany - Contact address: e-mail: aims@bbk1.rwth-aachen.de; website: www.aims.rwth-aachen.de

***June 11-15**

7TH INTERNATIONAL SCIENTIFIC CONFERENCE ON MODERN MANAGEMENT OF MINE PRODUCING, GEOLOGY AND ENVIRONMENTAL PROTECTION, SGEM 2007, Albena Co., Varna City, Bulgaria - Contact address: http://www.sgem.org/

***June 26-28**

MINSOC, MSA AND MAC FRONTIERS IN MINERAL SCIENCES 2007, Cambridge, UK - Contact address: e-mail mc43@esc.cam.ac.uk, or Adrian@minersoc.org; website: www.minersoc.org/pages/meetings/frontiers/index.html

***July 2-6**

SIXTH INTERNATIONAL HUTTON SYMPOSIUM ON THE ORIGIN OF GRANITES AND RELATED ROCKS, University of Stellenbosch, Stellenbosch, South Africa - Contact address: e-mail: hutton@sun.ac.za; website: http://academic.sun.ac.za/geology/hutton/hutton2007.htm

***July 17-20**

EUROPEAN CURRENT RESEARCH ON FLUID INCLUSIONS ECROFI-XIX, Bern, Switzerland - Contact address: e-mail: ecrofi_bern@geo.unibe.ch; website: http://www.geo.unibe.ch/ecrofi

***August 13-18**

12TH INTERNATIONAL SYMPOSIUM ON WATER-ROCK INTERACTION (WRI-12), Kunming, China - Contact address: fax +86-027-87481365; e-mail: wri12@cug.edu.cn; website: www.wri12.org

***August 19-24**

17TH GOLDSCHMIDT 2007, Cologne, Germany - Contact address: Conference Organizer: Dr. Herbert Palme; e-mail: erbert.palme@uni-koeln.de; website: www.the-conference.com/gold2007/index.php

August 20-24

9th BIENNIAL SGA MEETING, Dublin, Ireland - Contact address: Elva Hickey or Nicola Mc Grane, Conference Partners Ltd, 96 Hadington Road, Ballsbridge, Dublin 4; phone: +353 1 6677188; fax: +353 1 6643701; e-mail: elva@conferencepartners.ie, nicola@conferencepartners.ie. Scientific Programme and General Enquiries: Gerry Stanley, Geological Survey of Ireland; e-mail: gerry.stanley@gsi.ie; website: http://www.cpreregistrations.com/sga2007/

***August 25-30**

THE 6TH INTERNATIONAL COPPER-COBRE CONFERENCE (Cu 2007), Toronto, Ontario, Canada - Contact address: e-mail: bfarah@cim.org; websites: www.metsoc.org/com2007, www.cu2007.org

***August 26- September 1**

10TH INTERNATIONAL SYMPOSIUM ON ANTARCTIC EARTH SCIENCE, Santa Barbara, USA - Contact address: http://isaes2007.geol.ucsb.edu/

***September 17-20**

3RD INTERNATIONAL MEETING IN LILLE: "CLAYS IN NATURAL AND ENGINEERED BARRIERS FOR RADIOACTIVE WASTE CONFINEMENT", Lille, France - Contact address: http://www.lille2007.com

***September 24-30**

ORES AND OROGENESIS: CIRCUM-PACIFIC TECTONICS, GEOLOGIC EVOLUTION, AND ORE DEPOSITS, Tucson, Arizona, USA - Contact address: http://www.agssymposium.org/

October 28-31

GEOLOGICAL SOCIETY OF AMERICA ANNUAL MEETING, Denver, Colorado, USA - Contact address: GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301-9140, USA; phone: +1 303 447 2020; fax: +1 303 447 0648; e-mail: meetings@geosociety.org; website: http://www.geosociety.org/meetings/index.htm

***November 27-29**

6TH FENNOSCANDIAN EXPLORATION AND MINING CONFERENCE - FEM 2007, Rovaniemi, Finland - Contact address: e-mail: riitta.muhojoki@lapinliitto.fi; website: www.lapinliitto.fi/fem2007

***December 10-14**

AMERICAN GEOPHYSICAL UNION (AGU) FALL MEETING 2007, San Francisco, CA, USA - Contact address: AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009, USA; phone: +1-202-462-6900; fax: +1-202-328-0566; e-mail: meetinginfo@agu.org; website: www.agu.org/meetings

In memoriam: Hans-Jochen Schneider (1923-2006)

Bernd Lehmann

Technical University of Clausthal, Germany, Lehmann@min.tu-clausthal.de

Ulrich Hein

Universität Göttingen, Germany, Ulrich.Hein@octavia.de

Prof Hans-Jochen Schneider died on 7 June 2006 in Simbach-am-Inn, Bavaria, after several years of a serious illness following a brain stroke. Many former students and colleagues have lost a friend, dedicated teacher and source of inspiration. He was a professor emeritus of economic geology at Free University of Berlin and corresponding member of the Bavarian Academy of Sciences. He also was the co-editor of *Mineralium Deposita* during 1980-1990, and was a honorary member of SGA.

Hans-Jochen Schneider was one of the exponents of syngenetic thinking in ore genesis, with focus on syngenic processes in ore formation. His view of economic geology was strongly influenced from his PhD studies of carbonate-hosted lead-zinc mineralization in the Northern Calcareous Alps in the early 1950ies under the guidance of Professor Albert Maucher at the University of Munich. There was a strong focus on field observation and ore microscopy at that time, and the many stratiform textural features led to question the prevailing "telethermal" magmatic model. Textural observations at field to microscopic scale were interpreted in a then new, challenging way, as syngenic and early diagenetic precipitation of sulfides and fluorite from seawater, and thus pre-dating the Alpine orogeny. This strictly neptunistic concept later evolved towards a more generous general model of "intra-formational ore formation" where also formation waters as basinal brines or evolved basinal brines during the diagenetic or post-diagenetic evolution, respectively, of a rock sequence were involved. This conceptual development went parallel with the worldwide trend of increasing importance of geochemical methods in ore geology research.

Besides of his scientific work, Hans-Jochen Schneider was an enthusiastic and inspiring teacher. His fine sense of humour made many lectures and discussions un-

forgettable, and made him widely known beyond the academic world. He supervised almost 80 diploma and PhD theses, led several major research and technical cooperation projects (such as the foundation of the Institute of Applied Geology at the UMSA in La Paz, Bolivia), and also was involved in the launching of the German Continental Deep Drilling Program (KTB).

A particular feature of the personality of Hans-Jochen was his undogmatic and pragmatic view of the world, and his generosity. Although convinced of certain values he had a sense of history and knew about the relativity of truth.

From the beginning of his studies and onward, Hans-Jochen Schneider was interested in a very broad range of natural sciences, which reached from botany to paleontology, geography, cartography, glaciology, geophysics and the full spectrum of applied geology. Besides of economic geology, he lectured on engineering geology, hydrogeology and rock mechanics. He was a dedicated mountaineer and led the German Karakorum Expedition in 1959. His research in economic geology was focussed on carbonate-hosted Pb-Zn deposits in Europe, but also included gold and base metals in the Mediterranean region and Andean South America.

Selected bibliography (in chronological order):

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- Schneider HJ (1956) Geologische und erdmagnetische Arbeiten im NW-Karakorum. In Paffen KH, Pillewitzer W, Schneider HJ, eds, *Forschungen im Hunza-Karakorum*. *Erdkunde* 10: 1-33



Prof Hans-Jochen Schneider at Stüben, Arlberg, Austria, in 1971

- Schneider HJ (1960) Geosynklinale Entwicklung und Magmatismus an der Wende Paläozoikum-Mesozoikum im NW-Himalaya und -Karakorum. *Geol Rdschau* 50: 334-352
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>>> page 18 Forthcoming events

2008***March 2-8**

18TH CARIBBEAN GEOLOGICAL CONFERENCE, Santo Domingo, Dominican Republic
- Contact address: <http://www.sodogeo.org>

***May 26-28**

GAC/MAC, Geological Association of Canada / Mineralogical Association of Canada, Annual Meeting, Quebec City, QB, Canada - Contact address: <http://www.quebec2008.net/>

***July**

SEG-GSSA 2008 incorporating GeoForum 2008: Resurgence on Economic Geology and the Minerals Industry in Africa: Joint Conference of The Geological Society of South Africa (GSSA) and Society of Economic Geologists (SEG), Sandton Convention Centre, Johannesburg, South Africa
- Contact address: e-mail: info@seg-gssa2008.org; website: www.seg-gssa2008.org

***July 13-18**

18TH GOLDSCHMIDT 2008, Vancouver, BC, Canada.

***August 5-14**

33RD INTERNATIONAL GEOLOGICAL CONGRESS (IGC 2008): The Nordic Countries, Geoscience World Congress 2008, Oslo, Norway
- Contact address: A. Solheim; e-mail: as@ngi.no; websites: www.ngu.no, www.33igc.org

***August 18-24**

IAVCEI 2008 General Assembly, Reykjavik, Iceland - Contact address: e-mail: armh@hi.is

***September 23-28**

THE XXIV INTERNATIONAL MINERAL PROCESSING CONGRESS (IMPC 2008). Beijing, China - Contact address: e-mail: impc2008@impc2008.org; website: <http://www.impc2008.org/english/welcom.htm>

***October 5-8**

GEOLOGICAL SOCIETY OF AMERICA 120TH ANNUAL MEETING, Houston, TX, USA - Contact address: GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301-9140, USA; phone: +1 303 447 2020; fax: +1 303 447 0648; e-mail: meetings@geosociety.org; website: <http://www.geosociety.org/meetings/index.htm>

***December 15- 19**

AMERICAN GEOPHYSICAL UNION FALL MEETING, San Francisco, CA, USA - Contact address: E. Terry, AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 USA; phone: +1 202 777 7335; fax: +1 202 328 0566; e-mail: meetinginfo@agu.org; website: <http://www.agu.org/meetings>

2009

GEOLOGICAL ASSOCIATION OF CANADA AND THE MINERALOGICAL ASSOCIATION OF CANADA (Joint Meeting), (GAC-MAC). Toronto, Canada - Contact address: website: <http://www.halifax2005.ca/>

***October 18-21**

GEOLOGICAL SOCIETY OF AMERICA, 121ST ANNUAL MEETING, Portland, Oregon, USA - Contact address: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301-9140, USA; phone: +1 303 447 2020; fax: +1 303 447 1133; e-mail: meetings@geosociety.org; website: <http://www.geosociety.org/meetings/index.htm>

***October 25-30**

SOCIETY OF EXPLORATION GEOPHYSICISTS (SEG) INTERNATIONAL EXPOSITION & 79TH ANNUAL MEETING, Houston, Texas, USA - Contact address: e-mail: meetings@seg.org

2009

GEOLOGICAL ASSOCIATION OF CANADA AND THE MINERALOGICAL ASSOCIATION OF CANADA (Joint Meeting), (GAC-MAC): GeoCanada 2010, Calgary, Canada - Contact address: website: <http://www.halifax2005.ca/>

***October 31-November 3**

GEOLOGICAL SOCIETY OF AMERICA: 122ND ANNUAL MEETING, Denver, Colorado, USA - Contact address: GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301-9140, USA; phone: +1 303 447 2020; fax: +1 303 447 0648; e-mail: meetings@geosociety.org; website: <http://www.geosociety.org/meetings/index.htm>

SGA Short Course on Gold Mineral Systems GeoZentrum Munich, Germany June 5-9, 2006

Robert Moritz

Department of Mineralogy, University of Geneva, Geneva, Switzerland

This four day long short course was organized as an introduction to gold mineral systems, and included lectures and laboratory sessions. The lecturer team was composed of Prof. Steffen Hagemann, University of Western Australia, Prof. Robert Marschik, Ludwig-Maximilians University, Munich, Germany, Prof. Hartwig Frimmel, University of Würzburg, Germany, Dr. H. Albert Gilg, Technische Universität Munich, Germany, and Dr. Robert Moritz, University of Geneva, Switzerland. The short course was held in English at the Technische Universität of Munich.

The main purpose of the short course was to familiarise the participants with the geological and geochemical framework of different types of gold deposits. Five main topics were addressed during the theoretical part with lectures on orogenic, iron oxide copper-gold (IOCG), epithermal and the Witwatersrand deposits, and one lecture on the composition and the stable isotope chemistry of hydrothermal fluids.

The exercises were designed: (1) to identify hydrothermal alteration minerals and zonations on both hand sample and thin section scales, (2) to recognize typical ore, structural fabrics and wall-rock textures associated with the different types of gold systems, and (3) to constrain and evaluate P-T-X conditions of gold mineralization using fluid inclusion, stable isotope and mineral equilibria data sets. The course ended with a small exercise and a discussion on the exploration strategies and the significance of gold mineral analyses.

The short course was attended by ten graduate students, including seven participants from Germany, two from Switzerland, and one Canadian student. The course was extremely successful, and the limited number of participants allowed a very lively interaction among students and lecturers, and resulted in numerous and enthusiastic discussions among students coming from different universities and having different backgrounds.

The balance between lectures and hands-on exercises was highly appreciated by the participants, and shows that there is a need for such short-courses combining theory and laboratory sessions. The experience will be repeated in 2007, most likely at the same location in Munich with the same lecturer staff. The venue of the short-course at the Technische Universität of Munich allowed the organizers to keep the participation costs to a minimum for graduate students. Because of the practical implications of the short-course, the aim is also to attract participation from industry in the future, and of course to broaden the participation to other countries. Further information can be obtained from the organizers at:

agilg@mytum.de
shageman@cyllene.uwa.edu.au
marschik@lmu.de
hartwig.frimmel@mail.uni-wuerzburg.de
robert.moritz@terre.unige.ch



Thin section observations and exercises at the Technische Universität München.



Participants and lecturers at the short course (from left to right). Standing, back row: Robert Marschik and Solomon Gebresilassie. Standing, intermediate row: Sabine Vetter, Marina Défago and Christoph Dinger. Standing, front row: Hartwig Frimmel, Gesa Gräser, Alexander Schmiderer, Sebastian Staupe, Steffen Hagemann, Robert Moritz and Nima Nezafati. Sitting, front row: Christiane Mögele, Majka Kaiser and Albert Gilg.

The new SGA website

Georges Beaudoin, SGA regional vice-president North America
Université Laval, Québec, Canada



<http://www.e-sga.org>

The SGA has launched its new website in September 2006, but at the same address: www.e-sga.org. The new website has been entirely redesigned in its graphical interface and content (Figure 1). The website design was a team effort by council members who

contributed ideas, photos and comments, from February to August 2006. As you navigate into the website, you will view an horizontal list of pull-down menus that allow you to navigate within the website directly from the first page. Each section has

a unique set of pictures contributed by SGA members. All the pages from the website can be readily formatted for printout using the "Print version" link on the upper right corner of each page (Figures 1 and 2).

The website is divided in 8 sections. The "About" section gives general information about the SGA, its history and its Council. The "Publications" sections links to Mineralium Deposita, the SGA News and the Mineral Deposit Archive. SGA members are invited to contribute mineral deposit summary descriptions to add to the Mineral Deposit Archive.

The "Membership" section is of particular interest to SGA membership. In addition to membership information, application forms and student chapters, the "Membership" section comprises new content that are restricted to SGA members (Figure 2). To access the online, searchable, SGA member Directory, dues payment, and address change functions, SGA members need log into the website using your membership number and a password. Members that have

a valid email in our membership database have been notified of their membership number and password. If your email in our records is outdated or if you have yet to provide the SGA with an email to contact you, send your email to: info@e-sga.org. If you have lost your login information, the login page contains a "Forgot your password" link to receive automatically your password and membership number by email. In addition, the SGA website has an "Election" sub-section to allow electronic voting in our next election. In the future, the SGA will put more emphasis on online dues payment, address change and election of officers to increase efficiency and reduce costs.

The "Awards" section lists SGA awards (Young Scientist, Best Paper, and Student Awards), past awardees and application forms. The "Meetings" section links to

SGA Biennial meetings and other international meetings sponsored by the SGA. The "Useful links" section is a collection of links useful to SGA members: this is an evolving list to which you are encouraged to contribute by sending your suggestions to info@e-sga.org. The "Site Map" section is a structured list of the various pages of the website that can also be searched using the "search box" (Figures 1 and 2). Finally, the "Contact us" section is a list of SGA officers and contacts for common requests by members.

The new SGA website is designed to improve service to members, make information simple and easy to find, and to project a modern look of the SGA. For September 2006, the website had over 850 visitors for its first full month online.



SGA
SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS

Member Login Search for : Search

About Publications Membership Awards Meetings Useful Links Site Map Contact Us

Membership

You are here : [Membership / Intro](#) [Print version](#)

Membership in SGA is open to all geologists, mineral resources, industrial minerals and environmental aspects related to mineral deposits. SGA is an international society with global membership in over 50 countries.

Membership is 65 EUR and includes a free annual subscription to Mineralium Deposita and the SGA News. SGA members can get free colour plates in papers published in Mineralium Deposita. Members are eligible to reduced registration fees at SGA biennial meetings and at meetings co-sponsored by the SGA.

Get your **Membership application form** now!

Student Members

Student membership is offered for only 10 EUR to full-time students for a maximum of 4 years. Membership includes a free annual subscription to Mineralium Deposita (print and electronic) and receive the SGA News. Student members can get free colour plates in papers published in Mineralium Deposita. Student Members are eligible to reduced registration fees at SGA biennial meetings and at meetings co-sponsored by the SGA.

Get your **Membership application form** now!

Quick, what's the best way to keep up to date with new developments in your field?

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SGA Membership Application Form

Name, place, date, signature

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<http://www.e-sga.org>

College Green, Dublin

River Liffey, Dublin city

Trinity College Dublin,
Conference Venue

9TH BIENNIAL SGA MEETING

Mineral Exploration and Research: Digging Deeper



Trinity College Dublin, Ireland
20th - 23rd August, 2007

2nd Announcement and Call for Papers

www.conferencepartners.ie/sga2007



www.conferencepartners.ie/sga2007

Information at a Glance

Venue

The Meeting will be held at Trinity College Dublin, situated right in the city centre of Dublin. Founded in 1592, Trinity College is one of the oldest universities in Europe, and the 35 acre campus is located in the heart of Dublin city.

This 16th century campus, surrounded by attractive gardens, is an ideal location for conferences, with well equipped lecture theatres, accommodation, banking facilities, travel agency, shopping, and tourist attractions. The main Meeting building will be the Arts Building. All the Meeting hotels are within walking distance of Trinity Conference Centre and onsite student accommodation is available.

Language

The official language of the Meeting is English.

Registration

Registration for the Meeting should be made using the official registration form (enclosed). It should be returned by mail to Conference Partners Ltd, 2nd Floor, Heritage House, Dundrum Office Park, Dublin 14, Ireland

On-line registration is available on the Meeting website www.conferencepartners.ie/sga2007

Registration fees

Early Fee (before 27th April 2007)

Late Fee (after 27th April 2007)

	Early	Late
Full Delegates (member)	€475	€575
Full Delegates(non-member)	€575	€675
Student Fee	€250	€350
Accompanying person	€95	

Payments

All payments should be in Euros and made payable to Conference Partners Ltd.

Cancellation policy

Before 1st June 2007	Full Refund
Before 15th June 2007	75% Refund
After 15th June 2007	No Refund

Deadlines

Abstracts Submissions	2nd February 2007
Standard Registration	27th April 2007
Accommodation Bookings	22nd June 2007

Meeting organisers

Conference Partners Ltd,
2nd Floor, Heritage House, Dundrum Office Park,
Dublin 14, Ireland
Tel: +353 1 296 8688 Fax: +353 1 296 8678
E-mail: sinead@conferencepartners.ie
<http://www.conferencepartners.ie>

Meeting website

www.conferencepartners.ie/sga2007

Accommodation

A limited number of rooms at special discounted rates have been negotiated for delegates. Early booking is essential. Please refer to page 16.

www.conferencepartners.ie/sga2007

General Information

Ireland

Ireland is an English speaking island on the north western edge of Europe. It is 486 km long and 275 km wide. Ireland has 3,172 km of coastline – the longest coastline per head of population in Europe. The Republic of Ireland occupies three-quarters of the island and its capital city is Dublin.

Population

4.5 million, over one million of whom live in Dublin.

Dublin

Dublin, the capital of the Republic of Ireland, is built on the River Liffey and has a population of approximately 1.5 million people. It is situated be-

side the sea, and close to the countryside and mountains.

The rest of the country is easily accessible by car, train, or bus. Ireland, with its beautiful scenery, offers a range of attractions to the tourist including ancient archaeological sites and monuments, a variety of sporting activities such as fishing,

riding and golf, as well as traditional dancing and music.

A city of fine Georgian buildings, Dublin has been influenced by its Danish, Norman and English antecedents. It has excellent shops, museums, antique shops and a range of pubs and restaurants. It has four major theatres, including the world famous – Abbey theatre, concert facilities, art galleries and cinemas. There is a wide variety of sporting facilities including golf courses and sailing, as well as racecourses.

Climate

Ireland enjoys a temperate climate, with mild winters and relatively cool summers. Mean daily temperature in June is 18 °C. Dublin enjoys reasonable sunshine and rain belts reaching the east coast are frequently light and generally clear within a few hours. However it is always wise when travelling to Ireland to pack a rain mac or umbrella.



Documentation

Everyone entering Ireland must have a valid passport or, in the case of European Union Member States, a national identity card. Some visitors will require visas. Delegates should check with their local Irish representation. A valid driving license is required to drive in Ireland. Please note that it can take up to 6 to 8 weeks to process a visa application and early application is recommended. The Meeting Organising Committee, or its agents, cannot accept any responsibility for visa applications. Where a delegate is unable to attend because of failure to obtain a visa on time, the normal cancellation policy for the registration fee will apply.

Currency

The currency in Ireland is the Euro.

Shopping

Dublin has a busy city centre shopping area around Grafton Street and across the river. It also has large suburban shopping centres. There is a huge range of products to bring home – from traditional Irish hand-made crafts to international designer labels. Things to buy: woollen knits, tweeds, crystal, Claddagh rings, pottery, silver and music. Shopping hours are from 9.00am to 5.30pm Monday to Saturday, with shops open until 8.00pm on Thursdays, and most shops open on Sunday from 12.00pm to 6.00pm.

Insurance

Neither the local Organising Committee nor its agents will be responsible for any medical expenses, loss, or accidents incurred during the Meeting, Short Courses or Field Trips.

Delegates should arrange their own personal insurance to cover medical and other expenses including accident or loss. Where a delegate has to cancel for medical reasons, the normal cancellation policy will apply. It is recommended that citizens from EU countries bring with them a current EHIC (European Health Insurance Card)



DISCOUNT

General Information & Registration Fees

Tax refunds

Value Added Tax (VAT) is charged at 21% on most goods. Cash back is the simplest and most widely used VAT refund service that issues cash refunds on departure for a handling fee. Ask for a cash back form when you make your purchase.

Tipping

A small tip is appreciated for good service. Tipping is not usual in pubs and bars. Tip restaurants and taxi drivers 10% and porters €1 per bag.

Credit cards

Major credit cards are widely accepted.

Electric current

220 volts

Time

From March to October, Ireland operates on Greenwich Mean Time + 1 hour. The rest of the year it is on GMT.

What to pack

Include mainly casual wear. Jacket and tie for fine dining. Rainwear and comfortable shoes are advised.

Tours

A number of tours have been outlined in this brochure, but for those wishing to travel independently, the most convenient mode of transport is car hire. There are train and coach connections between the major towns, but to properly experience Ireland wandering is essential! Ireland offers a range of accommodation including various grades of hotels and guest houses and our world famous B&Bs where travellers stay with Irish families in their homes, and are provided with accommodation, usually en-suite, and a hearty Irish breakfast.

Metrifloation

Speed limits and distances in Ireland are shown in kilometres.

Smoking Policy

Under Irish law, smoking is not permitted in pubs, restaurants, hotel lobbies and most public areas.

Registration fees

Full Delegate Fee	Members
Early fee - before 27th April 2007	€475.00
Late fee - after 27th April 2007	€575.00
(The above fees apply to members of SGA/SEG/IAEG)	

Full Delegate Fee	Non Members
Early fee - before 27th April 2007	€575.00
Late fee - after 27th April 2007	€675.00

Student Fee	€250.00*
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* Students must forward a letter from their university supervisor confirming full time student status

Full Registration Fee & Student Fee includes:

- Entry to all technical sessions
- Daily morning and afternoon refreshments
- Welcome reception on Sunday 19th August
- State reception on Monday 20th August
- Meeting programme and all Meeting materials

Accompanying Persons Fee	€95.00
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Fee Includes:

- Dublin City Tour
- Welcome Reception on Sunday 19th August
- State reception on Monday 20th August
- Welcome Reception (Monday morning) w/ tea, coffee & scones
- Memento of your stay in Dublin

Please note that accompanying persons may not attend any of the technical sessions, present a paper or be a co-author.

Cancellation refunds

Before 1st June 2007	Full Refund
Before 15th June 2007	75% Refund
After 15th June 2007	No Refund

Money will not be refunded until after the Meeting.

Special Requirements

If you have special dietary requirements, need special accommodation, or need to provide our staff with emergency and/or contact information, please note your request on the Registration Form.

Preliminary Programme

Saturday 18th August

09.30 – 17.00

Workshops and Short Courses (venues to be confirmed)

Sunday 19th August

09.30 – 17.00

Workshops and Short Courses (venues to be confirmed)

14.00 – 17.00

Registration, Trinity College, Dublin

18.00 – 20.00

Welcome Reception for Delegates, Dining Hall, Trinity College

Monday 20th August

09.30 – 11.00

Official Conference Opening
Plenary Sessions – Invited Speakers
Ore deposits through space and time

11.00 – 11.30

Tea/ Coffee Break

11.30 – 13.00

Plenary Sessions – Invited Speakers
Ore deposits through space and time

13.00 – 14.00

Lunch

14.00 – 15.30

Parallel Sessions
Theme 1 – Future directions in economic geology – Research & Teaching
Theme 2 – Relating mineral deposits to tectonic events
Theme 3 – Felsic intrusion related mineral deposits

15.30 – 16.00

Tea/ Coffee Break

16.00 – 17.30

Parallel Sessions
Theme 1 – Future directions in economic geology – Research & Teaching
Theme 2 – Relating mineral deposits to tectonic events
Theme 3 – Felsic intrusion related mineral deposits

18.00

State Reception, Dublin Castle

Tuesday 21st August

09.30 – 11.00

Parallel Sessions
Theme 4 – Sedimentary rock-hosted Copper Deposits
Theme 5 – Dating mineral deposits
Theme 6 – New discoveries and advances in exploration in the Tethyan arc

11.00 – 11.30

Tea/ Coffee Break

11.30 – 13.00

Parallel Sessions
Theme 4 – Sedimentary rock-hosted Copper Deposits
Theme 7 – Dating mineral deposits
Theme 6 – New discoveries and advances in exploration in the Tethyan arc

13.00 – 14.00

Lunch

14.00 – 15.30

Parallel Sessions
Theme 8 – IAG Session: Carbonate –hosted Zn-Pb deposits
Theme 9 – Open Session
Theme 10 – Rare metal deposits

15.30 – 16.00

Tea/ Coffee Break

16.00 – 17.30

Parallel Sessions
Theme 8 – IAG Session: Carbonate –hosted Zn-Pb deposits
Theme 9 – Open Session
Theme 10 – Rare metal deposits

19.00

Optional Irish Night , Old Jameson Distillery

Wednesday 22nd August

09.30 – 11.00

Parallel Session
Theme 11 – Integrated exploration and new discoveries
Theme 12 – Advances in hydrothermal geochemistry
Theme 13 – Gold metallogensis Europe & Asia

11.00 – 11.30

Tea/ Coffee Break

11.30 – 13.00	Parallel Session Theme 11 – Integrated exploration and new discoveries Theme 12 – Advances in hydrothermal geochemistry Theme 13 – Gold metallogenesis Europe & Asia
13.00 – 14.00	Lunch
14.00 – 15.30	Parallel Sessions Theme 14 – Resource estimation- classification systems Theme 15 –Supergene formation and upgrading of ore deposits Theme 16 – Industrial minerals
15.30 – 16.00	Tea/ Coffee Break
16.00 – 17.30	Poster Sessions
20.00	Gala Dinner

Thursday 23rd August

09.30 – 11.00	North Atlantic Minerals Symposium (NAMS) Official Opening Theme 17 - Invited Speakers – NAMS: Metallogeny Theme 18 – Magmatism & ore genesis in the Tethyan Arc Theme 19 – New Discoveries in Africa
11.00 – 11.30	Tea/ Coffee Break
11.30 – 13.00	Parallel Session Theme 17 - Invited Speakers – NAMS: Metallogeny Theme 18 – Magmatism & Ore Genesis in the Tethyan Arc Theme 19 – New Discoveries in Africa
13.00 – 14.00	Lunch
14.00 – 15.30	Parallel Sessions Theme 20 – NAMS: Issues & Research Theme 21 –Uranium Deposits Theme 22 –Sea-floor systems (IGCP 502)
15.30 – 16.00	Tea/ Coffee Break
16.00 – 17.30	Parallel Sessions Theme 20 – NAMS: Issues & Research Theme 21 –Uranium Deposits Theme 22 –Sea-floor systems (IGCP 502)
	Conference Closing Ceremony

Call for Papers & Meeting Themes

Deadline

Potential speakers are invited to submit an extended abstract for consideration by the Convenors of each session. The deadline for the receipt of abstracts is Friday 2nd February 2007. The submission of an extended abstract does not necessarily imply that the paper will be selected for delivery at the meeting. The selection of papers to be presented will be made by the convenors for each thematic session and their decision will be final. The abstract should be submitted electronically as a *.doc document to the Chairman of Technical Sessions, Colin Andrew, at candrew@iol.ie.

The Extended Abstract should be no more than four pages long and include Figures, Tables and References. The author(s) should provide the following information separate to the Extended Abstract:

- Title of the proposed presentation.
- Author(s) of the proposed presentation with the proposed speaker as the first named author.
- Indicate which Thematic Session the paper is intended for.

There is an Open Session (20) available for those papers that do not fit into specifically identified Thematic Sessions (see below).

It is a condition of acceptance of any Abstract that at least the first named author Register for the Meeting when the Extended Abstract is accepted. You may be asked to accept changes to your Extended Abstract by the convenors of the session. Upon receipt of the changes and your registration for the conference, your Extended Abstract will be included in the Meeting Volume. You will be advised of the date for submission of the final Extended Abstract when you are contacted by the Editorial Committee.

As a large number of papers are expected, some authors may be offered a place in the Poster Sessions. You should indicate whether you are prepared to accept your presentation being submitted for the Poster Exhibition at the Meeting.

Meeting Themes

01. Ore Deposits Through Space and Time
02. Future Directions in Economic Geology – Research & Teaching
03. Society of Economic Geologists Session
New discoveries and advances in exploration in the Tethyan arc.
04. Sedimentary rock-hosted Copper Deposits
05. Irish Association for Economic Geology Session:
Carbonate-hosted Zn-Pb deposits
06. Dating Mineral Deposits
07. Felsic Intrusion-related Mineral Deposits
08. Integrated Exploration & New Discoveries
09. Resource Estimation - Classification Systems
10. Gold Metallogensis
 - a) Europe & Asia
 - b) Americas & Australasia
11. Advances in Hydrothermal Geochemistry
12. Industrial Minerals
13. Magmatism and Ore Genesis in the Tethyan Arc
14. NAMS Metallogeny
15. New discoveries in Africa
16. Sea-floor systems (IGCP 502)
17. Uranium Deposits
18. Supergene Formation and Upgrading of ore deposits
19. From Mineral Systems to Predictive Mineral Discovery
20. Open Session (General Economic Geology)

Convenors & Editorial Committee

Colin Andrew, Sandy Archibald, Nick Arndt, Antonio Arribas, Georges Beaudoin, Frank Bierlein, Gregor Borg, Adrian Boyce, Dave Broughton, Mac Canby, James Cleverley, John Clifford, David Cooke, Wayne Cox, Michel Cuney, Hartwig Frimmel, Bruce Gemmel, Rich Goldfarb, David Groves, Jeff Hedenquist, Chris Heinrich, Richard Herrington, Murray Hitzman, Brian Hoal, Al Hofstra, Kate Johnson, Andy Kerr, Rod Kirkham, Kalin Kouzmanov, Duncan Large, Ross Large, David Leach, Bernd Lehmann, Dave Lentz, Laurie Meinert, Julian Misiewicz, Ferenc Molnár, Daniel Nahon, Jan Paava, Jan Peter, Irena Peytcheva, Albecht von Quadt, Gordon Riddler, Paul Roberts, Steve Roberts, Peter Scott, Stuart Simmons, Gerry Stanley, Dave Symons, Fernando Tornos, Jamie Wilkinson, Patrick Williams.

Shortcourses

The following short courses are being offered:

- | | | |
|----|-------------------------------------------------|------------------------|
| 1. | Orogenic Lode Gold Deposits
½ day course | D. Groves
Cost: €85 |
| 2. | Intrusion-related Gold Deposits
½ day course | T. Baker
Cost: €85 |

This half day short course will present the latest geological models and exploration approaches to the recently recognised granite-related gold deposit class. Major granite-related gold deposit examples, including deposits from the Tintina Gold Belt and Northeast Queensland, will be used to illustrate the geological environment in which they form, their key characteristics and explorable features from terrain to deposit scale. The shortcourse will be presented by Dr Tim Baker from the Economic Geology Research Unit, James Cook University, who has worked on these systems in North America, Australia and Europe, and whose research has helped define this deposit class.

- | | | |
|----|-----------------------------------------------------|---------------------------------------|
| 3. | Sediment-hosted Base Metal Deposits
1 day course | J. Wilkinson / R. Large
Cost: €150 |
|----|-----------------------------------------------------|---------------------------------------|

Sediment-hosted deposits are major repositories of base metals that are interpreted to form by processes operating at different stages of basin development. The relative timing of mineralization of sediments with respect to their deposition, diagenesis and subsequent deformation during basin closure remain critical but controversial issues. This workshop will review the geological characteristics and genetic models for this ore type and present major examples from the Proterozoic basins of Queensland and the Phanerozoic basins of the Irish Midlands and the Red Dog district, Alaska. Current thinking on classification and ore-forming processes, including sources of fluids, metals and sulphur will be discussed, and selected sample suites will also be available for hands-on examination.

- | | | |
|----|-------------------------------------------------|-------------------------|
| 4. | Sediment-hosted Copper Deposits
½ day course | S. Roberts
Cost: €85 |
|----|-------------------------------------------------|-------------------------|

This half day course will focus on the setting, style and alteration associated with sediment-hosted copper deposits. Given the importance of Proterozoic age sediment-hosted copper mineralization, and recent intense scientific investigation, the Zambian Copperbelt will be a focus of the course. In addition to oral presentations, core material will be available which present the characteristic mineralization and alteration styles of the region.

- | | | |
|----|-----------------------------------------|-----------|
| 5. | Isotopes in Exploration
½ day course | Cost: €85 |
|----|-----------------------------------------|-----------|

"The use of O & H isotopes in exploration; mapping fluid flow in VMS and orogenic lode gold deposits"	G. Beaudoin
"Stable and radiogenic isotope systematics of porphyry and epithermal deposits"	D. Cooke
"Sulphur isotopes in exploration"	A. Boyce
"The use of U-Pb and U-Th-Pb dating in exploration"	Q. Crowley

6. Skarn Deposits
½ day course

L. Mienert
Cost: €85

A review of general skarn-forming processes will be followed by a more detailed examination of skarn mineralogy, petrology, and alteration zonation. Examples of major skarn deposits from around the world will be used to illustrate successful exploration practices at both the grass roots and mine expansion scale. The instructor, Larry Meinert, has worked in most major skarn districts of the world, is senior author of the review of skarn deposits in the 100th Anniversary Volume of Economic Geology, and is co-editor of SGA's flagship journal, Mineralium Deposita.

7. Applied structural geology for economic geologists
1 day course

C. McCuaig
Cost: €150

Key themes covered in the course will include:

Fluids, Structures and Metal – a simple conceptual framework for why mineral deposits are structurally controlled
How to build better road maps for mineral exploration through integration of multiple geoscience data bases
Regional Structure and Tectonic Frameworks – the templates for ground selection in project generation and acquisition strategies
Outcomes from applied process modelling of structures, fluids and mineralization

The course is very practical and highly interactive. The main focus is on geometrical analysis of mineral systems at the deposit to regional scale with the intent of improved resource delineation and targeting. Participants will leave with an increased confidence in applying structural geology to their work environment.

8. The Reporting of Mineral Resources and Ore Reserves PERC
½ day course

Cost: €85

This course will cover the Reporting of Resources and Reserves under the different Codes and Guidelines, with comparative analysis.

9. Advances in 3D Geological Modelling and Applications To Economic Geology Paul Hodkiewicz
1 day course

There are many industry software tools for the visualization of drillhole data and 3D geological modelling of mineral deposits. These same tools can also be used in academic research to improve the understanding of processes of mineralisation and deposit formation. The aims of the seminar will be to: 1) demonstrate the potential for broader application of these tools in academic research in economic geology, and 2) emphasize the common ground between applied research and industry requirements.

In the seminar, case studies for a variety of deposit styles will be presented, to demonstrate how advanced applications of 3D geological modelling can improve the understanding of processes of mineralisation and deposit formation. Both industry and academic geologists can benefit from advanced 3D visualization

SATURDAY 18			SUNDAY 19						
13.00-15.00	15.00-15.30	15.30-17.30	10.00-11.30	11.30-11.45	11.45-13.15	13.15-14.15	14.15-15.45	15.45-16.00	16.00-17.30
	COFFEE			COFFEE		LUNCH		COFFEE	
Iron Oxide Copper-Gold Deposits			Orogenic Lode Gold Deposits				Intrusion-related Gold Deposits		
Sediment-hosted Copper Deposits			Sediment-hosted Base Metal Deposits						
Reporting of Mineral Resources and Ore Reserves			Applied Structural geology for Economic Geologists						
			Isotopes in Exploration				Skarn Deposits		

Field Trips

The following field trips are being offered:

Field Trip 1: Iberian Pyrite Belt / Ossa Morena

Leaders: K. Anderson / F. Tornos
Cost: €540 (Supplement of €60.00 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 4 nights
 Lunch each day
 All transfers
 Flight from Dublin to Faro*
 Evening meals are not included
 Return flight not included
Dates: 23rd to 27th August 2007

Maximum number of participants: 20

The Iberian Pyrite Belt is one of the world's great mineral belts, hosting many large VHMS deposits. Mined since the Roman times, mining continues today at Neves Corvo. Participants will visit: Neves Corvo, Aljustrel, Aguas Teñidas, La Zarza and the Rio Tinto area.

The Ossa Morena Zone hosts many mineral deposits and occurrences, with the magmatic Ni-Cu and IOCG being of particular importance. Participants will visit: the Agua Blanca Ni-Cu mine and the Cala magnetite mine.

Field Trip 2: Parys Mountain / Avoca

Leaders: R. Herrington / B. Sheppard
Cost: €540 (Supplement of €60.00 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 3 nights
 Lunch and dinner each day.
 All transfers
 Return ferry ticket to Dublin - Holyhead
Dates: 16th to 19th August 2007

Maximum number of participants: 40

This trip will visit the historic mining areas of Parys Mountain in north Wales and Avoca in SE Ireland. Participants will visit: Avoca, Parys Mountain and felsic volcanic sequences in Snowdonia National Park.

Field Trip 3: Irish Zn-Pb Province

Leader: J. Kelly
Cost: €535 (Supplement of €100.00 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 3 nights
 Lunch and dinner each day
 All transfers. Trip will start and finish at Dublin.
Dates: 14th to 17th August 2007

Maximum number of participants: 16

The trip will allow participants to view the world famous Irish carbonate-hosted Zn - Pb deposits and to review the features of the deposits. Participants will visit: Tara Mines, Lisheen and Galmoy.

Field Trip 4: Lode Gold Deposits in the Dalradian of Northern Ireland

Leader: G. Earls
Cost: €250 (Supplement of €15.00 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 1 night
 Lunch and dinner each day
 All transfers. Trip will start and finish at Dublin.
Dates: 23rd to 24th August 2007

Maximum number of participants: 30

Exploration since the 1980s has uncovered several gold deposits, with two of the most significant being Dalradian-hosted lode gold-type deposits in Northern Ireland. Participants will visit Currinaghalt and the Cavanacaw mine.

Field Trip 5: Rehabilitation of Old Mine Sites in Ireland

Leader: G. Stanley
Cost: €610 (Supplement of €110.00 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 3 nights
 Lunch and dinner each day
 All transfers. Trip will start and finish at Dublin.
Dates: 24th to 27th August 2007

Maximum number of participants: 20

This trip will afford participants the opportunity to visit a number of historic mine sites in Ireland and will demonstrate the approach being taken in Ireland to hazard identification and risk categorization. Participants will visit: Glendalough, Avoca, Gortdrum and Silvermines

Field Trip 6: Fennoscandinavian Metallogeny

Leaders: P. Weiherd / P. Eilu
Cost: €750 (Supplement of €250 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 6 nights
 Lunch and dinner each day
 All transfers.
 Return flight not included
Dates: 24th to 30th August 2007
Flights: Flight costs are not included. Airlines flying from Dublin to Rovaniemi (Finland) are

Maximum number of participants: ?

The northern part of the Fennoscandian Shield is one of the most active mining regions in Europe. This region, most of which is north of the Arctic circle, hosts several world class deposits, i.e. the Aitik Cu-Au-Ag mine, the Kemi Cr-mine and the Kirunavaara Fe-mine. Apart from these deposits new recent discoveries of major orogenic gold and Ni-PGE deposits makes this region one of the most mineralized Palaeoproterozoic regions of the world. The field trip will take the participants to all major active mines and to prospects of interest. We will also discuss the tectonic and magmatic evolution of the regions and visit key exposures.

Field Trip 7: Sediment-hosted Copper and Lead-Zinc Deposits of Southern Poland

Leaders: D. Leach / M. Sass-Gustkiewicz / A. Piestrzynski / S. Mikulski and S. Oszczepalski
Cost: €960 (Supplement of €240 applies for single room supplement)
 Includes accommodation on Bed & Breakfast basis for 6 nights

Lunch and dinner each day
All transfers.
Flight from Dublin to Krakow*
Return flight not included.

Dates: 24th to 30th August

Maximum number of participants: 30

The field trip plans 3 days in the Lubin Copper district with two underground mine visits, inspection of mineralised surface exposures and examinations of drill core from the Zechstein basin in Poland. Participants will visit classic Kupferschiefer-type ores and underground exposures of gold-bearing zones. Participants will also visit two underground mines and surface exposures of the ore-bearing stratigraphy will be visited in the world-class Krakow-Silesia MVT Zn-Pb district. In addition, participants will visit the World Heritage Wieliczka salt mine near Krakow.

NOTES:

- Field trips are subject to minimum numbers of participants and may be cancelled if minimum numbers are not achieved.
- Flight costs for Field Trips 1 and 7 are estimated. Flight costs are subject to confirmation at time of booking (once minimum number of participants are achieved)

CANCELLATION POLICY:

The local organising committee will confirm on June 1st 2007, if the Field Trips are going ahead. Subject to minimum number of 15 participants on each field trip been achieved.

If a field trip is cancelled, delegates will be refunded their fee, less a 5% administration charge.

After the 1st June 2007 – 50% Refund

After 15th July 2007 – No refund

INSURANCE:

The conference organising committee or its agents, will not be responsible for any medical expenses, loss or accidents incurred during the Field Trips. Delegates are strongly advised to arrange their own personal insurance to cover medical and other expenses including accident or loss. Where a delegate has to cancel for medical reasons, the normal cancellation policy will apply. It is recommended that citizens from EU countries bring with them a current EHIC (European Health Insurance Card).

FOR MORE DETAILED INFORMATION VISIT THE
SGA MEETING WEBSITE AT

www.conferencepartners.ie/sga2007

www.conferencepartners.ie/sga2007

Registration form

Registration Details (Only one delegate per form)

Prof/Dr/Mr/Ms First Name Surname
 Name of Organization (as to appear on name badge)
 Address for correspondence
 City Postal Code Country
 Phone: Office Home Email
 No of Accompanying Persons (non delegates only) Names:

Registration Fees (€ Euro)

	Early	Late	
Full Delegate Fee (member)	€475	€575	I am a member of <input type="checkbox"/> IAGG <input type="checkbox"/> SGA <input type="checkbox"/> SEG
Full Delegate Fee (non-member)	€575	€675	
Student Fee *	€250	€350	

*(A letter from your University stating that you are a student must be provided)

Accompanying Person Fee €95

TOTAL A €

Short courses

Cost Total

Please indicate which short course you wish to attend, as numbers will be restricted. Refer to pg 12 for more details.

1. Iron-Oxide-Copper-Gold	€	<input type="checkbox"/>	5. Sediment-hosted base metals	€	<input type="checkbox"/>
2. Intrusion-related gold	€	<input type="checkbox"/>	6. Isotopes in the search for new discoveries	€	<input type="checkbox"/>
3. Orogenic lode gold	€	<input type="checkbox"/>	7. Applied structural geology for economic geologists	€	<input type="checkbox"/>
4. Sediment-hosted copper	€	<input type="checkbox"/>	8. Resources and reserves	€	<input type="checkbox"/>

TOTAL B €

Field Trips

Please indicate which field trip you wish to attend, as numbers will be restricted. Refer to pg 13 for more details.

1. Iberian Pyrite Belt / Ossa Morena	€	<input type="checkbox"/>	5. Rehabilitation of Old Mine Sites in Ireland	€	<input type="checkbox"/>
2. Parys Mountain / Avoca	€	<input type="checkbox"/>	6. Fennoscandia	€	<input type="checkbox"/>
3. Irish Zn-Pb Province	€	<input type="checkbox"/>	7. Base Metal Deposits of Southern Poland	€	<input type="checkbox"/>
4. Irish Gold Deposits	€	<input type="checkbox"/>		€	

TOTAL C €

Social Programme

Evening Social Programme (Please tick to confirm your attendance)

Date	Function	Cost	Total
19th August	Welcome Reception	included <input type="checkbox"/> tickets	€n/a
20th August	State Reception included	included <input type="checkbox"/> tickets	€n/a
21th August	Irish Night	€85 X <input type="checkbox"/> tickets	€ <input type="text"/>
22th August	Gala Dinner	€75 X <input type="checkbox"/> tickets	€ <input type="text"/>

TOTAL D €

Daily Excursions

Date <input type="text"/>	Tour <input type="text"/>	Cost <input type="text"/>	xTickets <input type="text"/>	Total <input type="text"/>
Date <input type="text"/>	Tour <input type="text"/>	Cost <input type="text"/>	xTickets <input type="text"/>	Total <input type="text"/>
Date <input type="text"/>	Tour <input type="text"/>	Cost <input type="text"/>	xTickets <input type="text"/>	Total <input type="text"/>

TOTAL E €

Accommodation

A limited number of rooms at specially discounted rates have been negotiated for delegates. Early booking is essential. Accommodation bookings should be returned by 22nd June 2007.

Please tick: ☐ I do not require accommodation ☐ I require accommodation for people

Arrival date Departure date No of nights

Please advise if accommodation is required the night before the pre congress tour

Special Requests

Name of person(s) sharing

Please indicate whether the person sharing is a ☐ Delegate ☐ Accompanying Person ☐ Other

University Accommodation Trinity College Dublin

Please put the number of rooms required in the appropriate box below

Ensuite Single ☐ Ensuite Twin 2 single beds ☐ Ensuite Double Apartment 2 single bedrooms within small apartment ☐

€ rate per night x Number of Nights Total €

Hotel Accommodation

Single Room(s) ☐ Double Room(s) ☐ Twin Room(s) (2 single beds) ☐ Other (specify)

Please list your hotel in order of preference

1st choice 2nd Choice

€ rate per night x Number of Nights Total €

While every effort will be made to allocate your first preference, should your first choice of hotel be fully booked, accommodation will be reserved for you in your second choice of hotel.

TOTAL F €

Payment

TOTAL A+B+C+D+E+F = €

Payments can be made by Visa, Mastercard or bank draft

Company cheques, euro cheques NOT drawn on an Irish bank and bank to bank transfers are NOT acceptable. Banker's drafts must be free of charge to the receiver, drawn in euros on an Irish bank, and made payable to Conference Partners Ltd. If bank charges are incurred the delegate will have to pay these before registration. Please note that reservations will not be confirmed until full prepayment has been received.

Please tick method of payment: Visa ☐ Mastercard ☐ Bank Draft ☐

VISA/Mastercard Card No:

Expiry Date(Month/Year): *CVV Number

*CVV is the last three digit number printed on the signature panel located on the back of your card.

Signature: Date:

Cancellation Policy

Registration Fee: Full refund before 1st June 2007. 75% Refund before 15th June 2007. No refund after 15th June 2007.

Accommodation: Full refund before 22nd June 2007. 1 night's accommodation will be charged for all cancellations received after 22nd June 2007.

Please note that an administration charge of €20 will apply for any amendments to a confirmed booking after 22nd June 2007.

Returning The Form

Please complete and return to Conference Partners Ltd., SGA2007, 2nd Floor, Heritage House, Dundrum Office Park, Dublin 14, Ireland. Tel: +353 1 296 8688 Fax: + 353 1 296 8678

Email: leah@conferencepartners.ie

Hotel	Rating	Single	Double	Distance from Meeting venue
Jacobs Inn	Hostel Sun -Thurs Night	€ 22	€ N/A	10 minutes
Jacobs Inn	Hostel Fri - Sat Night	€ 26	€ 165	10 minutes
Paramount Hotel	3 Star	€ 125	€ 165	8 minutes
Buswells Hotel	3 Star	€ 110	€ 160	6 minutes
Mont Clare Hotel	3 Star	€ 135	€ 165	6 minutes
Quality Hotel	3 Star	€ 140	€ 160	15 minutes
Davenport Hotel	4 Star	€ 165	€ 185	6 minutes
Alexander Hotel	4 Star	€ 165	€ 185	6 minutes
Westbury Hotel	5 Star	€ 223	€ 268	6 minutes

Trinity College Dublin				
Single en suite	Student accommodation	€ 75.50	n/a	on campus
Twin en suite	Student accommodation	€ 67	n/a	on campus
Double en suite	Student accommodation	€ 75.50	n/a	on campus