Celebrating 50th

SGA Anniversary (1965–2015)

SGA News

January 2015
Number 36

Speculation with mining shares in the 16th to 18th century in Germany in comparison with metal exploration worldwide today – Did the willingness to take risks in exploration changed significantly during the last 500 years?

Friedrich-Wilhelm Wellmer[1], Wolfgang Lampe[2]
[1] *Neue Sachlichkeit 32, D-30655 Hannover, Germany, fwellmer@t-online.de*
[2] *Arnikaweg 15, D-38678 Clausthal-Zellerfeld, Germany, wolfgang.lp@t-online.de*

Abstract

We compare records of historical economic data with respect to mine profit („Ausbeute“) and loss („Zubuße“) from the classical mining districts of the Harz Mountains (Lower Saxony, Germany), in the 17th and 18th century and the silver mining district of the Bohemian Erzgebirge (today Germany and Czech Republic) in the 16th century with present-day exploration. The willingness of investors to take risks is measured by the ratio of mines paying profits (in German“Ausbeute”) and mines making losses and requiring financial contributions (in German “Zubuße”): the A:Z-ratio. The A:Z-ratio in the Bohemian Erzgebirge was 1: 3.6 over a period of 50 years in the 16th century. For the Upper Harz silver mining district the most important vein system was the “Burgstädter Gangzug” with the richest mines of Dorothea and Caroline paying profits (Ausbeute) from 1709 and 1713, respectively, for more than 150 years. The A:Z-ratio fluctuates widely explainable by the discovery history of profitable mines; however, the average is around 1:3.6, too. Present-day exploration for minerals and for hydrocarbons shows similar ratios. Thus, a comparative investigation of the risk behavior over 500 years from the Erzgebirge via the Harz silver mining district to world-wide metal and hydrocarbon exploration today shows that the risk behavior – how much high-risk money can be spent in relation to the expected rewards – has changed little. Certainly technology has improved tremendously during this time, but also deposits have become more difficult to detect. Is it that technological advances just compensated for the increasing difficulties to discover new deposits? Or is it that statistically there is a psychological threshold for taking risks between 1:3 and 1:4?

Introduction

Even before the Americas were discovered and long before the Toronto Stock

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MAIN FEATURES

News of the Society

SGA Ordinary Council Meeting, April 2, 2014 Nancy, France

J. Pašava (SGA Executive Secretary), Czech Geological Survey, Prague, jan.pasava@geology.cz

Adam Piestrzynski (SGA Council member and Dean of the Faculty of Geology, Geophysics and Environmental Protection of the AGH) welcomed on behalf of the AGH University of Science and Technology Council Members (G. Beaudoin, S. Decree, H. Frimmel, K. Kelley, J. Kolb, B. Lehmann, J. Pašava, J. Relvas, and J. Slack). After a brief introduction of the host institute, G. Beaudoin (SGA President) thanked on behalf of SGA Council to A. Piestrzynksi for organization and hosting the meeting. Then Council approved suggested agenda.

Minutes of previous Council Meeting (April 11, 2013 Lisbon, Portugal)
After checking the actions, the Minutes were unanimously approved.

Reports of officers on Council
3.1. Report from President (oral report presented by G. Beaudoin)
3.2. Report from Executive Secretary (presented by J. Pašava)
3.3. Report from Treasurer (presented by H. Frimmel)
3.4. Report from Promotion Manager (presented by G. Beaudoin)
3.5. Report from Chief Editor, SGA News (presented by G. Beaudoin)
3.6. Report from Chief Editors, MD (presented by B. Lehmann)
3.7. Report from Chief Editor SGA Special Publications (presented by J. Slack)
3.8. Report from the Chief Editor SGA website (presented by G. Beaudoin)
3.9. SGA Educational Fund (presented by J. Relvas)
3.10. to 3.16 – Reports from Regional VPs (Asia – no report, Australia/Oceania – presented by G. Beaudoin, Europe – presented by S. Decree, North Africa and Middle East – no report, North America – presented by G. Beaudoin, South America – presented by F. Barra, South Africa – presented by H. Frimmel).
After discussion, Council approved the presented reports with great thanks and the following motions:
G. Beaudoin to address SGA Council on possible suggestions regarding the future of the SGA-Barrick Young Scientist Award and report at the next Council meeting.
G. Beaudoin to address SEG and IAGOD executive on improving communication between SGA and both the Societies.
G. Beaudoin to find out more about conditions of possible more SGA involvement in the organization of the "Ore deposits models and exploration" workshop organized by S. Scott et al. in China. At the moment SGA is willing to continue supporting SGA keynote speaker.
B. Lehmann/G. Beaudoin to consider discussing with Springer an increase in support of MD Editorial Offices.
H. Frimmel to follow up on suitable conservative-type investment for SGA funds (ad hoc reporting to SGA EC and Council).
H. Frimmel to prepare a financial plan for 2015 year-to-date and budget for 2016 for the next Council Meeting (based on figures from previous years).
P. Eilu to get in touch with A. Buettner (Springer) to negotiate a budget for SGA promotion (we need two more booths – one for China and the second one for Africa and good stock of promotional items for 2015 – a year of SGA 50's Anniversary due to increasing requests from Student Chapters, RVP's and newly also from possible National SGA Representatives/newly approved concept).
P. Eilu to prepare a pdf of poster promoting SGA and its 50's Anniversary to be distributed to Council members, SGA RVP's and possible SGA National Representatives in late 2014/early 2015.
All Council Members to send possible contributions to the upcoming issue of SGA News (no. 36) to Massimo Chiaradia by October 31, 2014.
M. Chiaradia to change layout of the SGA News cover page – adding "Celebrating 50th SGA Anniversary".
M. Chiaradia to publish logos of companies that contributed to the SGA EF.

SGA News

No. 36 January 2015

EDITORS
Massimo Chiaradia[1], Chris Heinrich[2]
[1]Department of Mineralogy
University of Geneva
Geneva
SWITZERLAND
[2]ETH Zurich
SWITZERLAND

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http://www.e-sga.org

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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.

DEADLINE FOR SGA NEWS NO. 37
30 April 2015

SGA NEWS – MAILBOX
Dr. Massimo Chiaradia
Department of Mineralogy
University of Geneva
Rue des Maraîchers 13
CH-1205 Geneva
Fax: +41 22 379 32 10
e-mail: editor-sga-news@e-sga.org
Massimo.Chiaradia@unige.ch

G. Beaudoin to ask Springer if they can adapt Table of content of MD which is electronically distributed to SGA members so that listed articles are directly linked to site where SGA member can get their pdf.
B.Lehmann/G. Beaudoin to prepare an editorial on MD history for no. 1/2015.
J. Slack to inform S. Hageman about the acceptance of the proposed concept for a book on "A Hydrothermal History of the Yilgarn Craton and its Relevance to Gold Exploration" and to report on any progress on this and other suggested or ongoing book projects at the next Council meeting.
N. Koglin to create a section on Actual News at website for highlighting "hot info", work on enabling payments through Pay-Pal, go ahead with creation of SGA group at LinkedIn.
S.Decree to negotiate with N. Arndt and EGU 2015 organizers conditions of possibly exclusive SGA sponsorship to "Ore Deposit" session.
G. Beaudoin to write a letter to all RVPs to encourage them to inform SGA Council which meetings in their region they plan to attend so that Council could organize some possible help in manning the booth and other SGA promotion.
J. Pašava to write Representatives of the Peruvian Student Chapter to thank for active help of students in SGA promotion at the Peruvian Geological Congress (Lima, October 2014).

SGA 2015 – status of preparation

The report was presented by A. S. André-Mayer. The SGA 2015 Conference website address is http://sga2015.univ-lorraine.fr. After discussion Council approved the presented report with great thanks and the following motions:
A. Piestrzynski to finalize details on the post-meeting Kupferschiefer field trip by October 31.
A. S. André-Mayer to send the text of the Second Circular of the SGA 2015 Meeting to B. Lehmann/G. Beaudoin who will secure its publishing in the upcoming issue of Mineralium Deposita.
A. S. André-Mayer to enable SGA Council members to check CNRS abstract submission system (the use approved by Council) before a public call.
A. S. André-Mayer to send a list of approached companies for sponsorship to J. Relvas.
A. S. André-Mayer to offer lower categories of meeting sponsorship in official SGA 2015 Meeting materials.
A. S. André Mayer and J. Relvas/F. Tornos to seek a suitable solution on financial logistics related to financing of the post-meeting field trip to IPB.
N. Koglin – at the occasion of celebration of the 50's Anniversary in 2015 to send an email to all SGA members to encourage them to provide any photos, posters, and/or other documents (digital or high resolution scans) related to past SGA activities to be send by the January 31, 2015 to J. Pašava, SGA Executive Secretary (mailing address : Dr. Jan Pašava, Czech Geological Survey, Geologická 6, 152 00 Praha 5, Czech Republic; email: jan.pasava@geology.cz).
J.Pašava to send email addresses of chairmen of the past SGA Biennial Meetings to N. Koglin and P. Eilu.
J. Pašava/G. Beaudoin to finalize and sign MOU with LOC SGA 2015 and send it to A.S. André Mayer for signature.

SGA 2017 – update (G. Beaudoin)

G. Beaudoin reported that no special activities were carried out with respect to SGA 2017.
Action: G. Beaudoin to begin work on a leaflet "Call for SGA 2017" which will be distributed at the SGA 2015 Meeting.

Progress report on membership drive from the last SGA Council Meeting (P. Eilu et al.)

The report was presented by J.Pašava. He noted that number of paid SGA members decreased from 1305 (by the end of 2013) to 1174 (by 29 September, 2014). During past 7 months we received about 130 new application forms which mostly resulted from Student Chapters activities and/or other SGA promotional events. The main task for SGA remains to keep new membership as long as possible. After discussion Council approved the report with great thanks and the following motions:
S. Lange to write an advanced note to remind SGA membership a payment of membership dues for 2015.
S. Lange to email reminders to all who didn't renew SGA membership at least 4 times a year (every 3 months).
G. Beaudoin to address all RVPs with a request for their collaboration regarding getting in touch with non-paying members.
All RVP's in collaboration with Council members should contact the members who haven't paid their fees for 2014. If anyone of Council members would be approaching some of those members, it's important to inform relevant RVP to avoid repeated reminders.

Status of development of SGA Student and Young Scientist network (A. Vymazalová and J. Relvas)

The report was presented by J. Relvas. After discussion Council approved the presented report with great thanks and the following motions:
A.Vymazalová to thank J. Trubač for looking after Facebook profile.
G. Beaudoin to address SEG/CEO to find out if SEG supports a model of joint SGA/SEG Chapters.

SGA award for recognition of special services to the society (SGA-KGHM Silver Krol Medal) – update (A. Piestrzynski)

The status was presented by A. Piestrzynski who informed Council that more details will be discussed at a joint meeting with KGHM Officials and Art Prof. Kucharsky who was asked by KGHM to prepare several different proposals of layout for a joint SGA-KGHM award. After presentation of various medal designs and follow up discussion in Lubin (October 22, 2014) it was concluded that Prof. Kucharsky will prepare several other proposals highlighting a portrait of Prof. G.L. Krol on front side and SGA logo with smaller KGHM logo on back side.
Action: G. Beaudoin to write a letter to Mr. Kulacz/KGHM to consider contributing to the SGA EF.

Requests for sponsorship

- Bolivian Chapter – USD 2700 (travel expenses through Keynote Speakers Program) – approved by Council based on email discussion
- 13th Freiberg Short Course in Economic Geology, December 8–12, Freiberg, Germany – EUR 1000 to support SGA student members participation – approved by SGA EC
- SGA Baltic Chapter – request for additional funding (EUR 1000) related to significant increase in membership and planned strong participation of Scandinavian student members in the Annual Chapter Meeting in Poland – approved by the SGA EC
- ECROFI 23 Meeting, June 26–28, 2015 Leeds, UK – EUR 960 – SGA keynote speaker or T. Pettke (Univ. of Bern as SGA speaker) – decision postponed/requested more info.

Any other business

- 10.1 Call for nominations for SGA 2015 awards (D. Huston).
  Action: All Council members are encouraged to take an active part in seeking new nominations to provide them to D. Huston or other members of the Award Sub-Committee.

- 10.2. Info on a joint project with MAC on co-publishing of Short Course Volume Series on Uranium (G. Beaudoin).
  Action: G. Beaudoin to finalize document between GAC-MAC and SGA.
- 10.3. SGA presence at the 35th IGC, September 2016, Cape Town – invitation from chair of the Scientific Program Committee (SGA session/keynote speakers/workshops).
  Action: H. Frimmel to wait for a reply from L. Robb and inform Council. Then to advise N. Koglin to launch a call for SGA promotion at the 35th IGC.
- 10.4. IUGS initiative on Resourcing Future Generations (D. Huston).
  In the past, SGA offered several actions towards RFG (through D. Huston to I. Lambert, the former IUGS SG but no reply was received from IUGS to date.
- 10.5. Proposal for organization of SGA Field Courses in Western Australia – update (Steve Micklethwaite and Cam McCuaige).
  This project was agreed to be put on hold because of difficult situation in mining and exploration business.
- 10.6. Proposal for creation of SGA National Representatives in at least "active countries" (F. Tornos, J. Pašava, RVPs).
  The proposal was presented by J.Pašava and approved by SGA Council.
  Action: G. Beaudoin to write a letter to all RVP´s to inform them about Council decision and ask for collaboration in identifying suitable persons in selected countries worldwide to help SGA outreach.

Date and Place of the Next Council Meeting

Suggested late April 2015 in Nancy, France (A.S. André-Mayer). Date and place will be announced in due time.

Informative list of past activities

- UNESCO-SEG-SGA Latin American Metallogeny Course (May 19–26, 2014 Quito, Ecuador) – M. Chiaradia SGA link.
- EUROGRANITES 2014 (July 12–18, 2014 South-West England) – organized by Camborne School of Mines and the University of Exeter – SGA approved EUR 1000 to support SGA student members - Jens Anderse
- XII International Platinum Symposium (11–14 August 2014, Yekaterinburg, Urals, Russia) – SGA two special session – A. Vymazalová (approved 2,000 EUR for SGA student members)
- IAGOD Symposium (August 19–22, 2014 Kunming, China) – two sessions sponsored by SGA: MVT, SEDEX, and VMS deposits through geological history and Black shale-hosted mineral deposits; SGA booth – Huayong Chen et al.
- Session on Gold Deposits at the IMA Meeting (September 1–3, 2014 Johannesburg, South Africa – L. Greyling (approved 1,500 EUR for a keynote speaker L. Robb)
- SEG Conference (September 27–30, 2014 Keystone USA) – invitation from SEG to have a complimentary booth – accepted
- The 3rd Short Course on African Metallogeny (29 September – 3 October 2014, Marrakech, Morocco) – A. Cheilletz et al. – jointly with IUGS, UNESCO, GSAf, SEG and others.

SGA Council members (left side: H. Frimmel, K. Kelley, J. Slack and J. Kolb with A.S. André Mayer and A. Cheilletz representing the SGA 2015 LOC; right side: B. Lehmann, J. Relvas, G. Beaudoin, S. Decree and A. Piestrzynski), discussing the SGA 2015 50th Anniversary Meeting in Nancy, France. Photo by J. Pašava.

Applications to SGA for meeting sponsorship must be submitted to Jan Pašava, 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

Dr. Jan Pašava
SGA Executive Secretary

Czech Geological Survey
Klárov 131/3
CZ-118 21 Prague 1
Czech Republic

Tel.: +420 2 5108 5506
Fax: +420 2 518 18 748
e-mail: jan.pasava@geology.cz

The report was presented by A. Cheilletz. Council approved the report with great thanks and appreciated leading role of A. Cheilletz and very successful activities of the whole team whose activities resulted in excellent SGA promotion.

- XVII Peruvian Geological Congress (October 12–15, 2014 Lima, Peru) – a letter of invitation received from E. Ferrari – suggested short course and/or session and/or keynote speaker (F. Tornos) - Council encouraged E. Ferrari and F. Tornos to work out a proposal and get back for Council approval.
  SGA Council greatly appreciated active role of E. Ferrari, the former RVP South America and also F. Tornos, the former SGA President who with a help of members of the SGA Peruvian Student Chapter carried out a very successful SGA promotion.

Informative list of future activities

- „Réunion des Sciences de la Terre"-"Colloque de Launay" (October 2014, Pau, France). A Cheilletz, M. Pagel and S. Decree et al. SGA booth pre-paid.
- 13th Freiberg Short Course in Economic Geology (December 8–12, 2014 Freiberg, Germany) – T. Höfig et al. (EUR 1000 approved for support to SGA student members)
- MDSG Meeting, Southampton, UK - 18–19 December 2014 – SGA promotion by S. Roberts
- 4th Short Course on African Metallogeny (March 22–31, 2015, Addis Ababa, Ethiopia) – H Frimmel et al. – 5 days lectures accompanied by 4 days field trip – First Circular planned to be released in November 2014
  Action: H. Frimmel to finalize Call for participation and distribute it in November 2014. At the same time to coordinate with SEG for an SEG keynote speaker.
  J. Pašava to inform IUGS President and Secretary General about the success of the 3rd Short Course on African Metallogeny and ask for continuing support for the 4th Short Course on African Metallogeny (2015).
- SGA 13th Biennial Meeting (August 24–27, 2015 Nancy, France) – A.S. André-Mayer et al.
- Goldschmidt 2015 (August 16–21, 2015 Prague, Czech Republic) – SGA sponsored sessions planned
  Action: J. Pašava to negotiate conditions of the SGA sponsorship of selected session of the Theme 12 (on Mineral Deposits) and to get back to Council.
- SEG 2015 Conference (September 27–30, 2015 Hobart, Australia) – SGA booth, plenary speaker, SGA session – R. Skirrow et al.
- PACRIM 2015 (March 18–21, 2015 Hong Kong, China) – SGA session, booth – Fan Hongrui, Huayong Chen, R. Skirrow, D. Huston et al.

Happy Birthday, SGA!!

Georges Beaudoin, Jan Pašava

Georges.Beaudoin@ggl.ulaval.ca, jan.pasava@geology.cz

The SGA is 50 years old!

In November 1965, a group of prominent economic geologists in Europe (G.L. Krol, President; P. Ramdohr, Honorary President; A. Maucher, Vice-President; A. Bernard, Secretary; J. Otterman, Treasurer; G.C. Amstutz, Chief Editor) formed the Provisional Executive Committee of the SGA. The new Society was to be formally established at the International Geological Congress in 1968 in Prague, but when the Congress was interrupted by invasion by Soviet troops, the constituent assembly had to be postponed. That was a rocky start!

Since then, the SGA has evolved into a leading, global scientific society with a membership of more than 1300 in more than 60 countries (Figure 1) – a success that was only possibly thanks to the volunteering work of many dedicated scientists across the world. The growth in membership is particularly important since 2005. We are particularly pleased by the large student membership (>400) in 2013. If the SGA was founded in Europe, it is now a truly international scientific society with large number of members in North and South America, Australia, and growing numbers in Asia and Africa (Figure 2). The SGA is actively recruiting members across the world, and we take special care to develop activities useful for members in South America, Africa, the Middle East, and Asia, by sponsoring regional meetings, student chapters, and offering regional metallogeny short courses (Latin America, and African Metallogeny), workshops (China) with partner organizations such as the SEG, IUGS, IAGOD, UNSECO, and others.

Year 2015 is not only special for our society's 50th anniversary but it will also see the 13th SGA Biennial Meeting in Nancy (France) – the place of the 1st SGA Biennial Meeting (1991). We are confident that this meeting will set a new standard for scientific exchange amongst students and scientists from both academia and industry. When the SGA launched its Biennial Meetings, at the suggestion of Maurice Pagel then Executive Secretary of the SGA, there were few opportunities for international scientific meetings on ore deposits. Since then, the SGA has held 12 Biennial Meetings on 4 continents, and we have established our meetings as the leading venue for mineral deposit research in the world.

After 7 Biennial Meetings in Europe, the SGA took the bold step to hold its 8th Biennial Meeting in Beijing in 2005 (Figure 3). We have since held meetings in Australia (Townsville, 2009), South America (Antofagasta, 2011), and we will hold the 14th Biennial meeting in North America in 2017 (Québec). Over that time frame, attendance to SGA Biennial Meetings has grown from about 300 to almost 700 in Uppsala (Sweden) in 2013. Attendance comes from the world, with delegates from academia and industry, and, importantly, almost 200 student delegates. The high scientific quality of our Biennial Meetings, carried through scientific sessions, short courses and fieldtrips has become a staple of our association. The conference papers published in the proceedings volumes of our meetings are available through the SGA online store (www.e-sga.org).

The program of the 13th Biennial Meeting, that will be held in Nancy (France) from August 24–27, 2015, will set a new benchmark. We warmly invite youto attend the 13th Biennial Meeting and to submit your latest research for the leading edge meeting on ore deposit research worldwide. This issue of the SGA News contains the outstanding program we propose for our next Biennial Meeting.

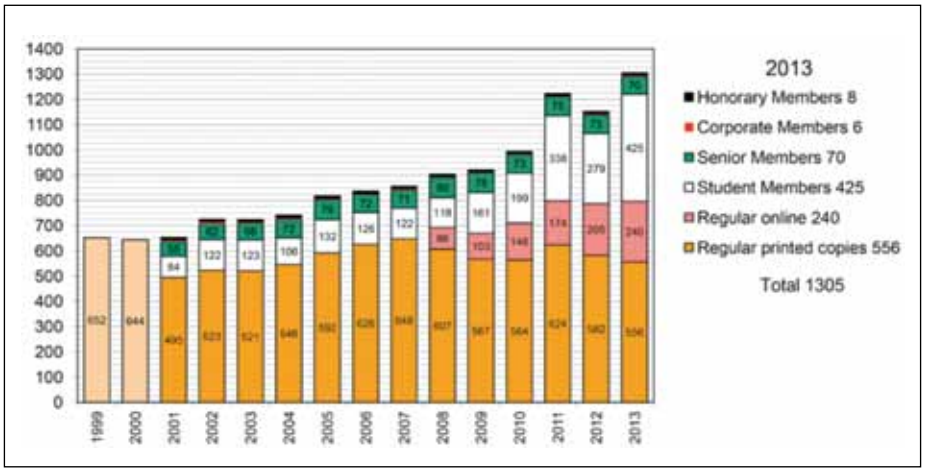

Figure 1: SGA membership development during the last 15 years.

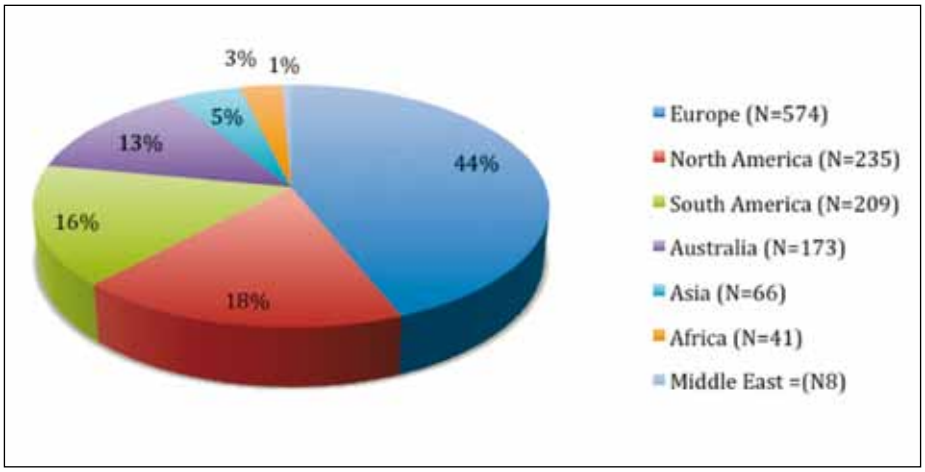

Figure 2: Distribution of SGA membership by region.

Figure 3: David Leach (left) SGA President (2005) opening the 8th SGA Biennial Meeting in Beijing, with Jingwen Mao (right) Chair of the Local Organizing Committee.

In 2014, the SGA launched the SGA Educational Fund (SGA EF) to gather support from industry to offer grants to attend SGA meetings, short courses, and workshops, to students and professionals from economically disadvantaged backgrounds. The SGA EF has already received generous donations and we are asking our members and industrial partners to contribute generously to the goals of the SGA EF. The SGA Vice-President, J. Relvas, leads the SGA EF committee, raising funds and setting supporting programs.

Mineralium Deposita is the official journal of the SGA, published by Springer, first under Chief Editor G.C. Amstutz (1966). In 1996, Chief Editor D. Rickard proposed to add a second Chief Editor for the journal, a position filled firstly by R. Goldfarb in Denver (U.S.A.), and since, Mineralium Deposita's two Chief Editors maintain editorial offices on different continents. This has contributed to establish Mineralium Deposita as premier scientific journal on mineral deposits worldwide. A measure of the journal standing is illustrated by the high, and rising, Impact Factor (IF, Figure 4). The journal is widely distributed, being available in almost 9000 institutions worldwide. The journal publishes plates and figures in color for free on high quality paper. The journal is available in electronic format as high quality pdf files, and SGA members have access to the complete archive of the journal, from Volume 1. If Mineralium Deposita publishes only highest quality scientific contributions, the review process is rapid, and once accepted a paper is published online within a month, where it is citable. This year is also special for Mineralium Deposita, with publication of Volume 50. The Chief Editors, B. Lehmann and G. Beaudoin, are planning a series of invited papers for this 50th volume, that should become benchmark references in mineral deposit research.

In order to better communicate with its membership, the SGA launched, in 1996, the newsletter SGA News and the society's website (www.e-sga.org). Since its launch, the SGA News has been edited by L. Fontboté, and now by M. Chiaradia. The SGA News is designed to bring information to membership. It typically contains a paper on mineral deposit geology, economy, prospectivity, or other general topics. Published twice a year, past issues of the SGA News can be downloaded from the SGA website. The website was initially managed by B. Lehmann at Technische Universität Clausthal. In 2005 it gained its own domain name, and the new website included an online store to distribute SGA publications, as well as the technology to accept dues payments. You will notice the SGA website has undergone a major facelift this year under the guidance of Web Editor Nikola Koglin. The SGA is also on Facebook, and you can expect an increased presence of the society on social media.

The SGA has established four biennial awards to recognize outstanding achievements by its members. The SGA-Newmont Gold Medal was established in 2006 to recognize „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 SGA Young Scientist Award was given the first time in 2003. Since 2007, the SGA-Barrick Young Scientist Award has been bestowed to young researchers with exceptional research achievements before the age of 40. The SGA gives a Best Paper Award to authors of an outstanding paper in Mineralium Deposita, on recommendation of the Board of Editors. Finally but not least, the SGA recognizes excellent oral and poster presentations during its biennial meetings. Student participation in SGA Biennial Meetings is of paramount importance for the SGA and takes special care to recognize the best upcoming scientists in mineral deposit research.

In summary, the SGA is in excellent health, with an envious reputation, a successful journal, a vibrant member community with enthusiastic student chapters, and renowned Biennial Meetings. Our challenges are to offer more scientific activities to our members, to reach out to members and geologists from regions where we want to expand our membership. The SGA has come a long way on its gold anniversary, and we have to ensure the next 50 years will witness the same growth in activity and reputation.

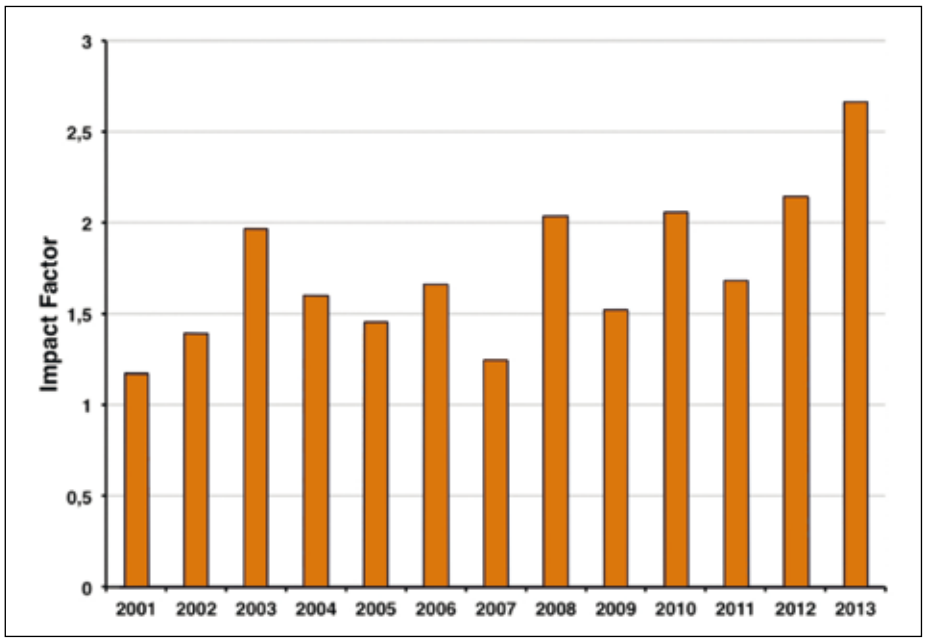

Figure 4: Impact Factor for Mineralium Deposita from 2011 to 2013.

SOCIETY FOR GEOLOGY APPLIED TO MINERAL DEPOSITS

SGA COUNCIL 2015

President	G. Beaudoin (Canada)
Vice-President	J. Relvas (Portugal)
Executive Secretary	J. Pasava (Czech Republic)
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Student Represent.	A. Vymazalová (Czech Rep.)

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Europe	S. Decree (France)
N. Africa-Mid. East	M. Bouabdellah (Morocco)
North America	S. Piercey (Canada)
South Africa	L. Greyling (S. Africa)
South America	F. Barra (Chile)

Councillors: term ending on December 31, 2015

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N. Bortnikov (Russia)
J. Gutzmer (Germany)
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J. Richards (Canada)
J. Wilkinson (U.K.)
P. Williams (Australia)

Councillors: term ending on December 31, 2017

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S. Archibald (Canada, East Asia)
W. Maier (Finland)
A. Piestrzynski (Poland)
F. Hongrui (China)
J. Kolb (Denmark)
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Ex officio Members, SEG

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Executive Director	B. G. Hoal (USA)

Ex officio Members, IAGOD

President	M. Jingwen (China)
Publication Manager	R. Seltmann (U.K.)

LIST OF NEW SGA MEMBERS (March 1 – October 31, 2014)

39 Regular and 86 Student Members applied for membership during this period

REGULAR MEMBERS

- Mr. Jean Essono Département Sciences de la Terre Faculté des Sciences Université de Yaoundé I BP 812 Yaoundé CAMEROON
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- Ms Roseline Katty Nguena Tetsa BP 13932 Yaounde CAMEROON
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- Mr. Nicolas Jacquemet 131, avenue Pasmentier 75011 Paris FRANCE
- Mr. Marc Poujol Geosciences Rennes, UMR CNRS 6118 Université Rennes 1 35042 Rennes Cedex FRANCE
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- Mr. Sheng-Hong Yang Pöllönkuja 3B, 10, 90540 Oulu FINLAND
- Mr. Ahmed Chakir Head of Geology Department OCP Group 10, Rue Gantour Quartier El Mohammadi 46300 Youssoufia MAROCO
- Mr. Ian Cameron 48 Rue Président Edouard Herriot Lyon 69002 FRANCE
- Mr.Pietari Skyttä Ortenniityntie 8 Fi-21410 Vanhalinna FINLAND
- Mr. Ignacio Labrador Monforte Avenida Viana 1255 , DEP 1601, Viña del Mar. V Región de Valparaiso CHILE
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- Miss Katthy Fernanda López Escobar Villas del Seguro M1 V-10. Millagro ECUADOR
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- Mr. Marcello Imaňa Avalidleudet 20 93591 Norsjö SWEDEN
- Mr. Lucas Marshall Regional Chief Geoscientist – North America Teck Resources Ltd. 3300-550 Burrard Street Vancouver, BC, V6C 0B3 CANADA
- Ms Reinet Harbidge 1st Floor, Savoy Court, Strand LONDON, WC2 R0EZ United Kingdom
- Mr. Martin J. Gole 8 Landor Road Gooseberry Hill, WA, 6076 AUSTRALIA
- Mr. Adrian Byers Level 1, 28 Ventnor Ave West Perth, 6005 AUSTRALIA

STUDENT MEMBERS

- Mr. Abdelmalek Ismaili Alaoui CP 40160 No. 37 Lot Anas – Marrakech MOROCCO
- Mr. Amal El Arbaoui No. 37 Lot Anas Mhamid Marrakech / Maroc CP 40160 MOROCCO
- Mr. Christopher Fuanya B.P. 1906 Akwa, Douala CAMEROON
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- Mr. Emmanuel Tangko BP 1906 Akwa, Douala CAMEROON
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- Mr. Kevin Coin 439 Rue de Saint Didier 01470 Briord FRANCE
- Mr. Olle Bertilsson Vänortsvägen 5 SE-97754 Luleå SWEDEN
- Ms Emma Brånn Porsögården 10 SE-97754 Luleå SWEDEN
- Mr. Mathis Warlo Bruksvägen 4D SE-97594 Luleå SWEDEN
- Mr. Erik Nilsson Assistent vagen 56 SE-97752 Luleå SWEDEN
- Mr. Marko Moilanen MSc. Sauvarinne 9 90900 Kiiminki FINLAND
- Mr. Sojien Moise Taylor B.P. 67 Faculty of Sciences B.P. 9546 Road Castelneau Douala-Akwa CAMEROUN
- Mr. Jukka-Pekka Ranta Kalhutie 15 B 90230 Oulu FINLAND
- Mr. Per-Albin Norman Klintvägen 95 SE-97335 Luleå SWEDEN
- Mr. Albert Costa Solé C/ Penedés 89B, El Prat de Llobregat 08820 (Barcelona) SPAIN
- Mr. Dani Rodríguez Garcia C/ Josep Ma de Sagarra 55, 1r. El Vendrell, 43700 Tarragona SPAIN
- Ms. Antonia Thijssen Uilenstede 29-3153 1183AA Amstelveen The Netherlands
- Ms Gila Merschel Campus Ring 1 28759 Bremen GERMANY
- Ms Nathalie Tepe Bremeshavener Strasse 8-10 28217 Bremen GERMANY
- Mr. Sebastian Viehmann Jacobs University Bremen, SES Campus Ring 1 28759 Bremen GERMANY
- Mr. Sebastián Hreus Lúčna 8 060 01 Malý Slavkov Slovak Republic
- Ms Ronja Eränen Karhusvägen 4 SE-97754 Luleå SWEDEN
- Ms Emelie Hedlund-Nilsson Väderleden 9, Lgh. 130 SE-97633 Luleå SWEDEN
- Mr. Jesse Clark 7 Ayredale Avenue, Clearview South Australia 5085 AUSTRALIA
- Mr. Per Kautto Vänortsvägen 9, Lgh. 1202 SE-97754 Luleå SWEDEN
- Mr. Mats Mattias Brodin Professorsvägen 32b SE-97751 Luleå SWEDEN
- Mr. Zimer Sarlus Professorsvägen 11 SE-97751 Luleå SWEDEN
- Miss Madelen Estholm Puoitakvägen 10c 98332 Malmberget SWEDEN
- Ms. Heiko Friedrichs Mariebergsgatan 87 SE-95432 Gammelstad SWEDEN
- Ms Jenni Harju Väderleden 11, Lgh. 0022 SE-97633 Luleå SWEDEN
- Mrs Khulan Berkh Doktorandin am Institut für Geowissenschaften Friedrich-Schiller-Universität Jena Carl-Zeiss Promenade 10 07745 Jena GERMANY
- Mr. Gabriel Lehmann Klarastrasse 18 79106 Freiburg GERMANY
- Miss Carmen Pinto-Ward 28 Glazebrook Close West Dulwich, London, SE21 8RP United Kingdom
- Mr. Sam Allinger Adler Salvius Väg 88 SE-14653 Tullinge SWEDEN
- Ms. Linneá Johansson Näsbyvägen 25G SE-95262 Kalix SWEDEN
- Ms Irene Royo Garcia 43202 Avgda Països Catalans No. 30 5e B Reus (Catalunya) SPAIN
- Ms Jenny Olsson Fiskmyrevägen 4 SE-13463 Ingarö SWEDEN
- Miss Maria Alexandra Ramirez Torres Alborada 5ta Etapa Mz IH Villa 5 Guayaquil, Guayas ECUADOR
- Mr. Cristhian Alejandro Aguilar Aguilar Urdesa Central, Sexta, Balsamos, Condominio Centauro 107 Guayaquil, Guayas ECUADOR
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- Miss Gissela Elizabeth Ramirez Torres Alborada 5ta Etapa Mz IH Villa 5 Guayaquil, Guayas ECUADOR
- Miss Daniela Maryesa Acuña Viteri Km 31, 5 Via Perimetral Guayaquil, Guayas ECUADOR
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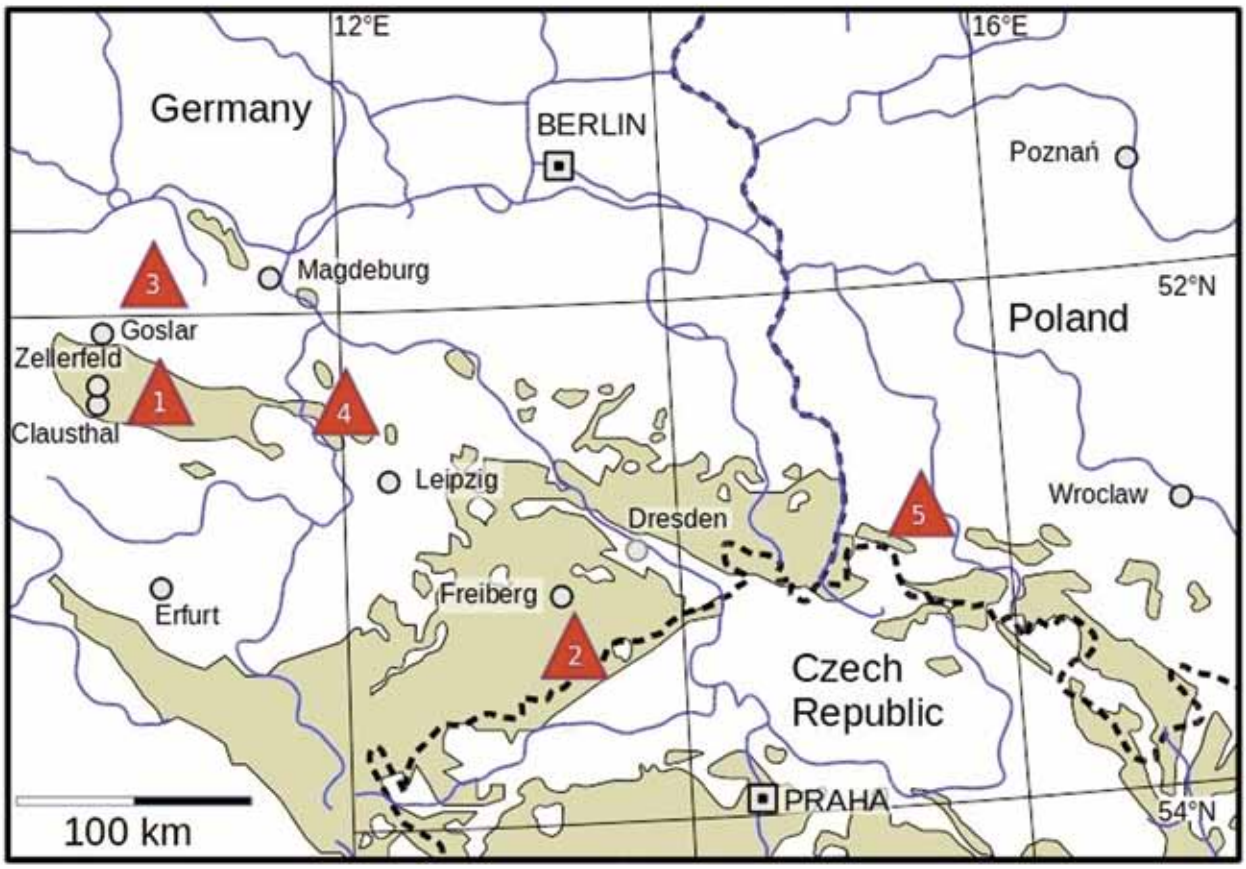
- Mr. Miguel Andrés Chilito Figueroa 111011 Diagonal 86A 101-40 Int 25 Ap. 401 Bogotá COLOMBIA
- Mr. José Alfredo López Colunga Postcode: 67400, Juarez street #707 between 5 de mayo and Jose Silvestre Arramberri Nuevo León, General Terán MÉXICO
- Mr. Juan Carlos Mosquera Erazo ECUADOR
- Miss Diana Carolina Rojas Olazábal Mz. F3 LT30 Calle 59 Urb. El Pinar Comas Lima PERÚ
- Mr. Óscar Fabián Ríos Mocha Ciudadela IESS M2 5 Villa 14. Machala – El Oro ECUADOR
- Miss Janet Juanna Martínez Sarapura Mariano Moreno I1, piso 3° Dpto. 1. San Miguel de Tucumán, CP 4000 ARGENTINA
- Mr. Diego Alonso Salgado Venegas Pasaje Salitnera Solferin Block A Depto. 101 EI Palomar Copiapo Región de Atacama CHILE
- Mr. Muhammad Sajid, PhD Scholar Room # 3051, CSM, Penryn Campus Penryn, Cornwall, TR10 9EZ United Kingdom
- Mr. Erik Haroldson 402 Shepard Ter Madison, WI 53705 Wisconsin USA
- Mr. Benjamin Odey Omang Department of Mineral Resource and Petroleum Engineering Federal Polytechnic Auchi P.M.B. 13,Auchi Edo State, Nigeria AFRICA
- Miss Elena Shaparenko ul. Lyapunova 2-918 Novosibirsk, 630090 Russian Federation
- Miss Maria O. Shapovalova 630090, 18A Pirogova ul., k. 409 Novosibirsk, Novosibirskaya oblast' Russian Federation
- Miss Alisa I. Antropova 630090, Pr. Koptyuga 3 Novosibirsk, Novosibirskaya oblast' Russian Federation
- Mr. Yaroslav Yu. Shelepov 630090, 4a Vesenniy proezd, app. 72 Novosibirsk, Novosibirskaya oblast' Russian Federation
- Mr. Szymon Kojder ul. Leszczyńska 27/18 Bielsko-Biala 43-300 POLAND
- Mr. Tomáš Žitný Partyzánská 291 293 07 Mladá Boleslav Czech Republic
- Mr. Jiří Wlosok 749 01 Nové Lublice Czech Republic
- Mr. Ján Pavluš Húskova 87 040 23 Košice Slovak Republic
- Mr. Ossian Aström Klintvägen 89 97332 Luleå SWEDEN
- Mr. Nicolai Bitsch Hutweg 10 79110 Freiburg GERMANY
- Ms Valentina Taranovic 1001 East 10th Street Dpt of Geol Sci – Indiana University Bloomington IN 47405 USA
- Mr. Mikael Vasilopoulos Tellervontie 2A, 11/1 90570 Oulu FINLAND
- Ms Nanna Rosing-Schow Tellervontie 2A, 4/2 90570 Oulu FINLAND
- Mr. Mikko Nenonen Kandintic 1 F 36 90570 Oulu FINLAND
- Ms Anne Brandt Taidonkaari 1 B, 9/3 90570 Oulu FINLAND

>>> page 1 *Speculation with mining shares in the 16th to 18th century in Germany*

Exchange was established, by far the most important exchange for stocks of mining and exploration companies in the world today, speculation in mining stocks existed. On the Leipzig Trade Fair, one of the oldest trade fairs in Europe, mining stocks were traded as far back as 1472 (Stadtmuseum Leipzig 2002). The famous composer Johann Sebastian Bach (1685–1750), who worked in Leipzig from 1723 till his death in 1750, owned "Kuxe" (mining shares) in the traditional Freiberg mining district of the Erzgebirge in Saxony, Germany (Spree 2011). The same was true for the famous poet Johann Wolfgang von Goethe (1749–1832) and the universal scholar Gottfried Wilhelm Leibniz (1646–1716) (Giersberg 1999; Horst 1966). Whereas Goethe at one time was mines minister for the small German principality of Sachsen-Weimar and Leibniz was also active as a "mining engineer" from 1679 to 1685 and 1692 to 1695, trying to improve the silver mines in the Harz Mountains in Germany, for Johann Sebastian Bach it certainly can be ruled out, that he had anything to do with mining. His buying of "Kuxes" can be very well compared to a layman's speculating today in mining or penny stocks of junior companies on stock markets such as the Toronto Stock Exchange.

We start our survey with a short introduction to the terminology and organization of mining in medieval and following New Ages times in Germany and Central Europe: The share companies were called "Gewerkschaften" (not to be confused with the same German word for labor unions). The shares were called "Kuxe" having special rights and obligations. The rights, naturally, were to obtain profits, called "Ausbeute" in good years , but in periods of losses, the shareholders, the "Gewerken" had to cover the losses directly at the end of a quarter or at the end of a year, called the "Zubuße". The rights of the shareholders did not entail the right or duty to manage the mine; they could only invest money with the hope of high rewards, the "Ausbeute". Under the so called "direction principle" the mines were managed by the "Bergamt", the state mining office. The top officer was the "Berghauptmann" who represented the duke of the territory and was normally from the nobility. The state mining officials managed an entire district solely under the



Polymetallic vein deposits:

1 Upper Harz district	>5,000 t Ag
2 Erzgebirge and Bohemia	~11,000 t Ag

Massive sulfide deposits:

3 Rammelsberg	4,100 t Ag

Kupferschiefer deposits:

4 Mansfeld/Sangerhausen	14,100 t Ag
5 Lubin, Poland	>30,000 t Ag

Mesozoic and younger

Paleozoic and older

Fig. 1: Location of the Upper Harz mining district and other important silver mining areas in Germany and neighboring countries (Source: Asch 2005, Baumann et al. 2001, Knitzschke 1995, Stedingk 2012, Seifert 2014, own estimates)

aspect of maximizing cash flow and profits regardless of the ownership structure of the "Gewerkschaften" of single mines.

After the end of the Thirty Years' War in 1648 until the middle of the 18th century the western Harz Mountains (Upper Harz) was the most important silver mining district in Germany, more important than the "Erzgebirge" in Saxony or the "Kupferschiefer", the latter being the most important silver producer in Germany over its total mining history (Fleisch 1982) (Fig. 1). Silver in those times was the monetary metal par excellence and, relative to gold, had a value 3 to 5 times higher than today (Green 1999). The mining district of the western Harz Mountains then was controlled by two branches of the princely Guelph family, one branch residing in Hannover, who in 1714 also became kings of England (personal union), and one branch in Braunschweig/Wolfenbüttel. The northernmost part, the so called "Communion Harz" with the administrative center in Zellerfeld was owned jointly by both branches, 4/7 belonging to Hannover, 3/7 to Braunschweig/Wolfenbüttel, the southern part, the "Einseitige Harz", with the administrative center in Clausthal was owned 100 % by the Hannover House. From the mid-14th century to the mid-16th century mining in the Harz Mountains stopped altogether due to the plague pandemic. From the new start in the middle of the 16th century (since 1524 correspondence, since 1540 production statistics) till 1865 complete uninterrupted records still exist which are now combined in the "Mining Archive" of the state of Lower Saxony in Clausthal. After 1865 a new mining law was introduced reducing the role of the state mining authority with regard to economic aspects. Clausthal was not destroyed during World War II and the various city fires never harmed the mine records (Wellmer and Lampe 2014).

Austheilung vom Ueberschuß der Königl. Großbritannischen auch Chur-Fürstlich-Braunschw. Lüneb. und Grubenhagischen Löblichen Bergwercke / Clausthal und St. Andreas-Berg.

Im Schluß des Quartals Trinitatis, den 16. April, 1735.

Ausbeute Rthlr. | Nahmen der Zechen.

— Thurm Rosenhof: freye H. 3. a
110. Dorothea. l
30. Carolina. m
10. Neue Benedicta. n
8 Kranich. i
4. Alter Seegen. b
2. S. Margretha. g
2. Anna Eleonora. i
2. S. Elisabeth. k
2. H. Christian Ludwig. h
2. Gegendrum. d
2. Braune Lielie. c
— Sophia. e

S. Andreas-Berg.

8. Samson. o
6. Catharina Neufang. o
4. S. Andreas. q
2. König Ludwig. p

Summarum aller Ausbeut in diesem Quartal thut 25220. Rthlr.

Neue angelegte Zubuß auf vorgedachten und nachbenahmten Bergwercken.

Im Schluß des Quartals Crucis, den 16. Julii 1735. zu berechnen.

Nahmen der Zechen und Stollen.

Thurm Rosenhof. Zugs. — Zuß: fl. ß

Fürsten-Stolln
Raben-Stolln
Zilla 2
Silber-Segen b 2
Princessin Lovise 3
Wille GOttes und thätisch Heer 2
Drey Könige c 4
S. Johannes f 4
Neu Jahr 3
Drey Brüder a 1
Löwenburg — 5
Neues Glück — 5
Neue Landes-Herr —

Burgstetter Zug.

H. Johann Friedrich
Schwan
S. Lorentz 6
Schützen-Gesellschaft
Einigkeit am Zellbach
Hauß Braunschweig
Englische Treu d 3
H. Georg Wilhelm e. g. h.
Ritter Casimir
Hauß Sachsen
S. Nicolaus
König Wilhelm 2
Nachtigal
Auerhahn
Osterröder-Zeche 3
Philippina
Weisse Roß
S. Michaelis-Segen — 5
Landes-Wolfahrt
S. Jacob — 5
König Joseph — 5
König Balthasar — 5
Gabe GOttes und Rosen-Busch 1 —
Juliana Sophia 1 —
Hauß Hannover 1 —
König Carl 3 —
Prinz Wilhelm 3 —
Princessin Anna 2 —
Königin Anna 2 —
Neue Haus Zelle
H. Georg Ludwig — 5
H. Friederich
Heinrich Gabriel k 2 —
Grüne Hirsch — 5
Drey Steiger 3 —
Ritter Heinrich
Printz Friedrich Ludwig n — 5
Chur-Printz Georg August — 5
Princessin Amalia — 5
S. Ursula — 5
König Georg — 5
Princessin Elisabeth — 5
Neue Fortuna — 5
Carl August 2 —
Neuer H. Ernest August 2 —
Princessin Maria 3 —
Neue S. Andreas 1 —
Gnade GOttes im Polsterthal 2 —
Charlotta 2 —
König David 2 —

Beym Camschlacken.

Albertina Wilhelmina 2 —
Neue Christiana 3 —
Kron Calenberg 2 —
Bergmanns-Trost 2 —
Weisse Taube 2 —
Neue Sarepta 2 —

Am Schönenberg.

Grosse Christoph 2 —

Hauptzug des Burgstetter Zugs.

Haus Hertzberg
Printz Augustus
Printz Carl
Printz Christian
Ritter Hieronymus
Haus Scharfenberg
Weisse Bähre
Hertzog

S. Andreas-Berg.

Gnade GOttes o 4 —
Felicitas 6 —
Fünff Büchere Mosis 3 —
Drey Ringe 3 —
Tobiensberg-Hoffnung
Kupffer-Blume 4 —
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Neue Gideon 4 —
Engelsburg am kleinen Oderberge 2 —
Wein-Traube
Kobolds-Grube 4 —
Segen des HErrn 3 —
Silberburg 3 —

Bey der Schlufft.

Sonnen-Glantz 2 —
Sonnen-Auffgang 3 —
Neues reiches Glück

Altenau.

Schatz-Kammer 3 —
Rose 3 —
Altenauer-Glück 4 —
Silber-Lielie 4 —
Käyser-Krone 3 —
Silber-Grube 4 —

Im Lutterbergis: Forste.

Kupffer-Rose 2 —
Lauterbergs-Glück
Lutter-Segen 6 —
Auffrichtigkeit im Engenthal 15 —
Freudenberg 8 —
Frische Lutter 3 —

Fig. 2: „Bergzettel" of 1735 of the silver mines of the „Einseitiger Harz" (western Harz Mountains)

Data source for the risk evaluation

All quarterly "Ausbeute" (profits) and "Zubuße" (loss) payments were recorded in the so called "Bergzettel". An example is shown in Fig. 2 for the first quarter of 1735. In the one column on the left the names of the mines with "Ausbeute" payments per Kux are listed, the two columns on the right contain the names of the mines with "Zubuße" payments per Kux. It is obvious that the number of "Zubuße" mines is much larger than the number of "Ausbeute" mines. All "Bergzettel" have been systematically evaluated (LBEG undated) and are the basis for the following risk evaluation by means of a profit-to-loss-ratio (Ausbeute to Zubuße = A: Z-ratio) and a comparison with mining and exploration risks in the 16th to 18th century and today.

Sames and Wellmer 1981 evaluated a multitude of modern exploration campaigns for the exploration risk today. The basis were data from Bailly (1962). The data collection was augmented with worldwide unpublished data, to which the senior author had access to when managing the exploration subsidy program of the Federal German Government from 1979 to 1982 (Sames and Wellmer 1982). The results are summarized in Table 1.

For the 16th century there are data available from Sombat (1919) from the Bohemian Erzgebirge (Table 2).

The averaged value is 1:3.6. This is a value which comes close to the ratio of success to failure to be expected for today's exploration projects (Table 1). The ratio should lie between 1: 16 and 1: 3 and closer to 1:3, the reason being that in those times there was no grass roots exploration in modern understanding. Exploration then started when a vein structure and at least some encouraging indications of mineralization had been discovered. Tonnage was not so critical. Also small mineralizations were exploited. Table 2 is based on a vast statistical sample of over 900 cases with an A:Z-ratio practically constant over 50 years. So we shall take the ratio 1: 3.6 as a reference value for our detailed investigation in the Harz Mountains.

Tab. 1: Chances of an exploration project becoming a profitable mine in the second half of the 20th century (Sames and Wellmer, 1981).

1.	2.	3.	4.	5.	6.	7.
Detailed reconnaissance	Detailed surface prospection	Drill target identified	New mineralization	New mineralization with some tonnage	Orebody outlined	New ore deposit (mineable)
1: 800	1:700	1:90	1:16	1:3	1:2	1:1

Tab. 2: Ratio of "Ausbeute" (profits) and "Zubuße" (losses) mines in the 16th century in the Bohemian Erzgebirge (from Sombat, 1919).

Year	Number of „Ausbeute" mines	Number of „Zubuße" mines	Ratio „Ausbeute" to „Zubuße" mines (A:Z-Ratio)
1525	125	471	1:3.8
1535	217	697	1:3.2
1545	120	452	1:3.8
1555	83	312	1:3.8
1565	63	237	1:3.8
1575	34	128	1:3.8

The rewards for investing in mines today and in the past

First the possible rewards for investing in high risk exploration shall be examined. Nobody would take a high risk if the rewards were not appropriate. Nobody would spend 100 $ with a possible reward of 200 $ if the chance for a reward is only 1:200. People speculating in penny stocks of exploration companies see large rewards through tremendously increasing share prices before their inner eyes. An example is the Poseidon boom in Australia in 1969/70. During a nickel price boom the company Poseidon NL discovered a nickel deposit in Western Australia. Before the discovery the share price of Poseidon was 0.80 A$. After the discovery was announced, the share price jumped to 280 A$ in the beginning of 1970 prior to its complete collapse. The case history of the discovery of the huge nickel deposit of Voisey's Bay in Newfoundland, Canada (140 Mt @ 1.6% Ni) in 1993 is a comparable example. The deposit was discovered by the Canadian junior company Diamond Field Resources (DFR). In 1996 the deposit was sold for 4.3 billion Can-$ to the Canadian major INCO, today a subsidiary of the Brazilian major mining company Vale. The share of DFR shot up from 0.82 Can-$ to the equivalent price of 108.50 Can-$, taking into account a share split (Canadian Mines Handbook 1997/1998).

An example comparable to the above is known from the historical Harz silver mines. Here, in the "Einseitige Harz" the by far richest mines were the mines of Dorothea and Caroline, the latter named after Caroline von Ansbach, the wife of George II, king of Great Britain and elector of Hannover. Dorothea started "Ausbeute" payments in 1709, Caroline in 1713. Lampe (2004) compared the "Ausbeute" payments of Dorothea and Caroline with "Ausbeute" payments of other mines in the "Einseitiger Harz" on the basis of the "Historische Nachrichten" (Historical News) of Henning Calvör (1686–1766) who was a teacher, protestant minister, scientist and mining historian in Clausthal (Table 3).

It is obvious that all mines in the "Einseitiger Harz" in 59 years before the discovery of the highly profitable Dorothea and Caroline mines paid less "Ausbeute" than the two mines Dorothea and Caroline did in only about half the time.

Tab. 3: Comparison of „ Ausbeute" in the „Einseitiger Harz" in the 17th and 18th century in Thaler (Lampe 2004). The Thaler (derived from "Joachims-Thaler", and living on in the "Dollar" of several modern currencies) was a silver coin used throughout Europe for more than 400 years.

Mines	Period	Number of years	„Ausbeute" (in Thaler)	Average/year (in Thaler)
All mines	1617–1676	59	783.107	13.273
Dorothea	1709–1744	35	2.136.506	61.043
Caroline	1713–1744	31	823.333	26.559

These historical statistics show that there are not only very few highly profitable mines and a large number of loss mines ("Zubuße" mines), but also numerous mines with normal and somewhat mediocre profit payments. Comparable modern statistics are available: Statistics from gold mining in Australia are the first example. Out of the 88 mines, which produced up to 1919, 24 paid back their investment and also paid dividends, 28 paid back their investment but suffered losses otherwise, and 36 not even paid back their investments (Brant 1968). The second are statistics about dividend payment s of Canadian mines from 1894 to 1967 (Kruger 1969), shown in Fig. 3.

So it becomes obvious that the statistical distribution of the profits of mines is highly skewed. For the evaluation of such a skewed distribution the Pareto distribution can be used (Schlittgen 2003). In the Harz Mountains there are various vein structures called „Gangzug". The main „Gangzug" was the Burgstätter Gangzug which includes a sufficient number of mines to draw meaningful statistical conclusions. The Pareto distribution will be applied to two samples of annual data from the Harz silver mines on the Burgstätter Gangzug, i.e. 1688, before the by far richest mines of Dorothea and Caroline began paying "Ausbeute", and 1735, after Dorothea and Caroline started paying "Ausbeute"(see the "Bergzettel" in Fig. 2, left column).

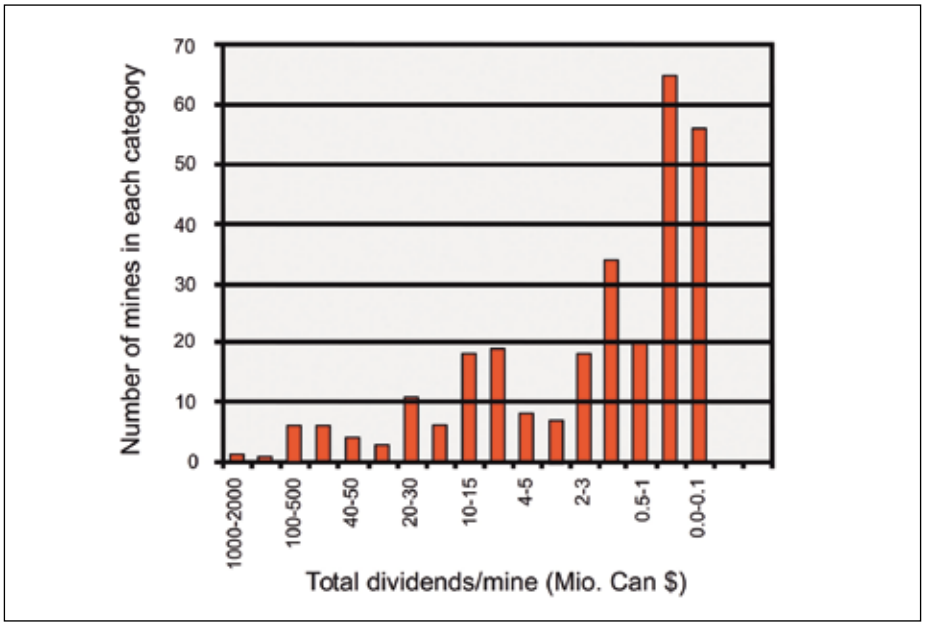

Fig. 3: Dividend payments of Canadian Mines from 1894 to 1967 (Kruger 1969).

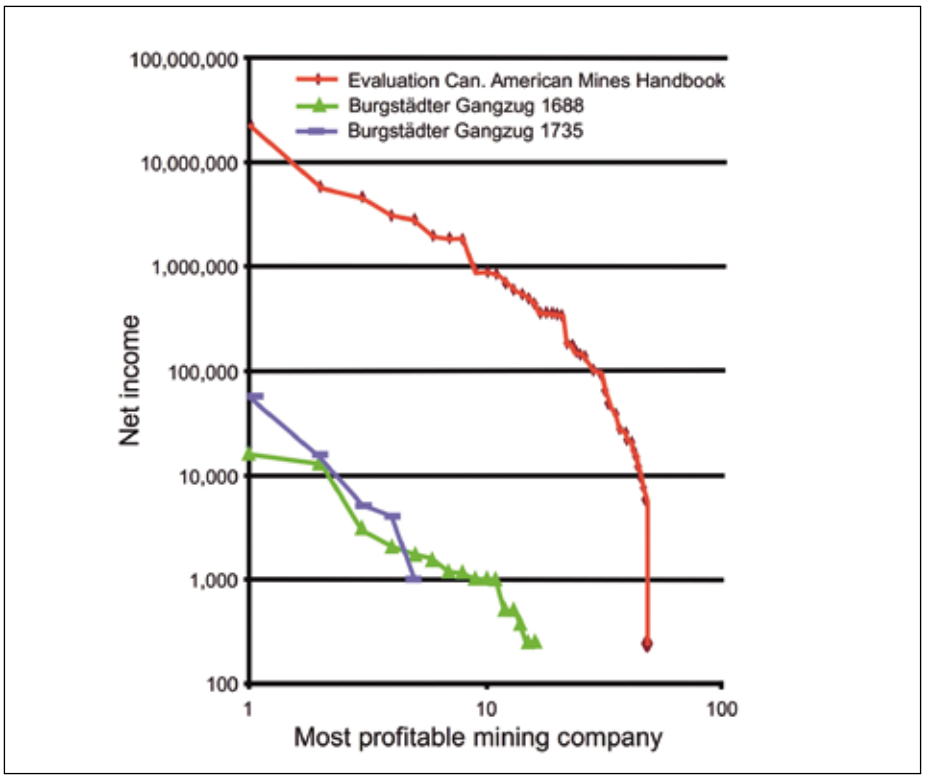

Fig. 4: Profits of the silver mines of the Burgstädter Gangzug (western Harz Mountains) in the years 1688 and 1735 in comparison to Canadian mining companies in the year 2011. Rank test using a log-log-graph.

These two distributions are compared with the net income of Canadian mining companies in 2011 (Canadian American Mines Handbook 2011). Note: To make the data compatible the yearly "Ausbeute" payments were multiplied with 130, the number of "Kuxe" for a mine in the Einseitiger Harz (Morich 1954).

A simple graphical test, a rank test, was carried out for comparing the Pareto distribution. If the data are sorted according to magnitude and plotted on double-logarithmic scale, for comparable distribution the gradients should be the same. The results are shown in Fig. 4. It can be seen that the gradients at the beginning, i.e. where the most profitable mines plot, are quite comparable. For the Canadian mines the graph bends at the end to the right. This is where the many mining companies with little net income plot. These, however, are not critical for the vision investors have when investing in speculative mining stocks.

So the conclusion can be drawn that the reward situation in the silver mining district of the "Einseitige Harz" in the 17th and 18th century can well be compared to the mining industry in Canada today.

Evaluation of the A:Z-ratio for the silver mines in the Harz Mountains

As mentioned above the Burgstätter Gangzug is the most representative vein structure in the Harz mining district. For the mines on this "Gangzug" the ratio "Ausbeute" mines to "Zubuße" mines (A:Z-ratio) and the number of mines were averaged for 10 year periods. The results are plotted in Fig. 5 and compared with the standard value of 3.6 of the Bohemian Erzgebirge. As Fig. 5 shows the average of 3.6 also applies to the Burgstätter Gangzug as a longtime average, albeit with wide variations. These variations become understandable when taking the development of the Burgstätter Gangzug into account:

- There is a strong increase of mines starting in 1670. This was enabled by the increase of the numbers of water ponds, collecting rain and snow water as the

energy needed to drive water wheels for the pumps to keep the mines dry. Naturally each new mine starts as a "Zubuße" mine, meaning as an exploration mine on a favorable vein structure. Some mines were successful and became "Ausbeute" mines. So the A:Z-ratio improved although the number of mines still increased for some time.

- Then the most profitable mines of Dorothea and Caroline started paying "Ausbeute" in 1709 and 1713 The number of mines did not much increase until 1740, because all possible mine locations on the vein structure were taken up. But the A:Z-ratio deteriorated from 1:2.5 to 1:5. There is an obvious reason for the deterioration of the A:Z-ratio. Mines which under normal circumstances would have been closed continued as "Zubuße" mines due to the incitement of investors' phantasy after the discovery of the rich ores in the Dorothea and Caroline mines. Only after 1740 the number of mines went down, meaning "Zubuße" mines closed, thus improving the A:Z-ratio.
- Follows a stable period of 50 years with a ratio very close to the standard value of 3.6. Then more and more mines were combined into larger more profitable units thereby the number of mines decreased and the A:Z-ratio improved.
- Very little influence can be seen in war events. The time sequence in Fig. 5 only starts at the end of the Thirty Years' War (1618–1648) which devastated Central Europe. Clausthal, however, was only briefly touched by war events. Otherwise, the silver mines in the Harz paid high "Ausbeute" during the war (Lampe 2004). The large wooden main church in Clausthal was inaugurated in 1644. Also the Seven Years' War from 1756 to 1763 had only limited influence, maybe influencing the minimum of the A:Z-ratio in the period of 1751–1760.

When looking at the other vein systems in the Clausthal and Zellerfeld area and at a vein system about 30 km to the southeast of Clausthal, St. Andreasberg, situated also in the "Einseitiger Harz", the A:Z-ratios are generally worse than on the Burgstätter Gangzug. This can also be explained by exploration behavior as observed in Canada or Australia today. On a known vein system there are only a limited number of positions available for starting an exploration mine. If after a sensational find like Dorothea and Caroline all possible positions on the most favorable Burgstätter Gangzug were taken

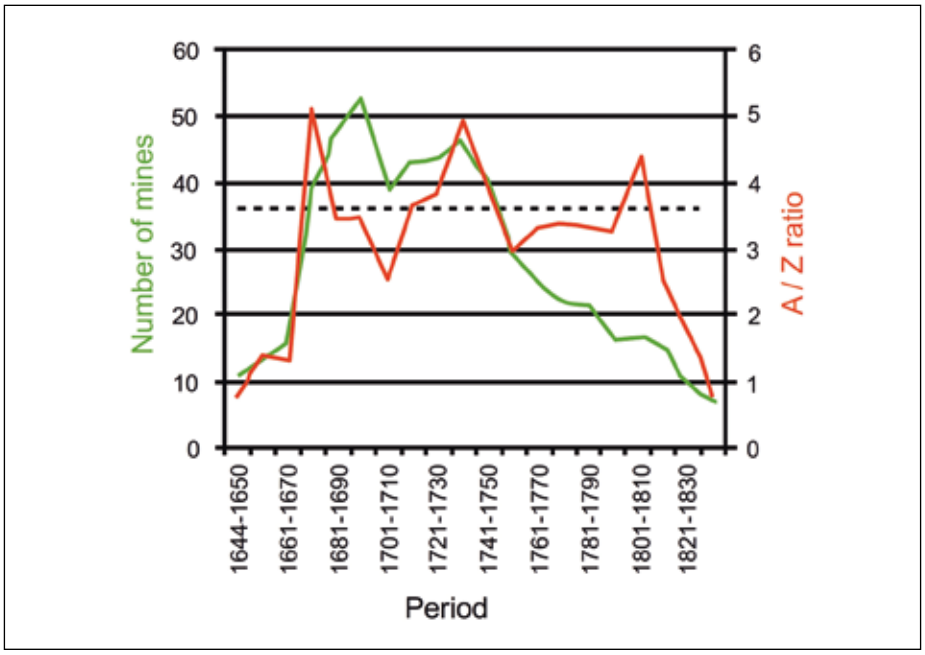

Fig. 5: Number of mines and the A:Z-ratio (averaged over 10 years) of the Burgstädter Gangzug from 1640 to 1830 in comparison to the A:Z-ratio of the Bohemian Erzgebirge.

up, the "staking rush" spilled over to less favorable vein systems. The St. Andreasberg region was a favorite target for mining speculation in the 16th and 17th century (Morich 1954). Whereas in the Clausthal area certain rules gained by experience had been learned where to look for favorable mineralization, there were no rules at all in the St. Andreasberg area. Mineralization appeared and disappeared rather abruptly. So speculation in mining in St. Andreasberg shares was practically gambling.

Conclusion

A comparative investigation of the risk behavior over 500 years from the Erzgebirge via the Harz silver mining district to modern world-wide base and precious metal exploration shows that the risk behavior – how much high-risk money can be spent in relation to the expected rewards – has barely changed. Certainly, technology has improved tremendously during this time, but deposits also have become more difficult to discover. Is it that the technological advances just compensated for the increasing difficulties to discover new deposits? Or is it that there is statistically an intuitive threshold of 1:3.6, or let us say between 1:3 and 1:4? Concerning the quality of exploration projects certainly there is no boundary value. There is a continuous risk gradient from low-risk to high-risk projects: the higher the risk the more difficult it is to find exploration funds.

The oil industry could perhaps give a hint. Formerly the success ratio quoted was between 20 and 35 %. (Alfaro et al. 2007; Repsol 2014). This comes close to the ratio of 1:3.6 in the metals field. However, nowadays due to technology improvements like 3D seismics or refined visualization technology the success rates have increased to 50 % or better (BP 2014). Statistics for the US show a fluctuating success rate for the period between 2007 and 2011 of between 55 and even 70 % (EIA 2014). Such high values may be influenced by a special US effect: higher success rates for shale oil and gas.

There is one aspect, however, that has changed drastically over the centuries: the readiness to continue exploring for many, many years. For example, the mine of St. Johannes in Clausthal was a "Zubuße" mine over 58 years from 1759 to 1817. But persistence paid. As mentioned above, the Dorothea together with the Caroline mine was one of the two by far richest mines in the Harz district. It stayed a "Zubuße" mine for 49 years, for 4 years it broke even, and then continuously for 155 years it paid amazingly high "Ausbeute".

Acknowledgements

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Iron ores of the Barrandian Paleozoic in central Europe – Field trip report from the SGA Student Chapter Prague

Ondřej Krátký, David Dolejš

Institute of Petrology and Structural Geology, Charles University, Prague

The SGA Student Chapter Prague organized one of its field trips to visit sedimentary iron mineralization in the Paleozoic volcanosedimentary sequences of the Prague Basin (Barrandian) in central Europe. Nine students participated in this one-day trip, which was led by Assoc. Prof. David Dolejs.

The Barrandian is a classical area of Neoproterozoic to Devonian volcanosedimentary strata, affected by the Variscan orogeny. In the Middle Cambrian through Ordovician, the deposition of predominantly shallow marine conglomerates, graywackes, mudrocks and shales was accompanied by intermittent volcanic activity of calc-alkaline basalts, andesites, rhyolites and their subaqueous pyroclastic products. Several of these volcanic centers were source of energy and chemical components for the formation of perivolcanic or hanging-wall iron-oxide mineralization. The formation of ironstones continued to stratigraphic hanging wall as well as more distal sedimentary settings, and gradually evolved into oolitic iron deposits, which occur as several horizons In the Ordovician siliciclastics. The deposition of these siderite-, chamosite- or hematite-bearing oolitic iron ores coincides with their worldwide formation on shallow marine continental shelves at this time interval. Ironstones in the Barrandian represent classical and previously economic accumulations, which were exploited from prehistoric times until 1960's. The field stops offered a rich opportunity to compare volcanic and epiclastic products and several mineralization styles, which recorded different influences of volcanic activity, hydrothermal and subaquatic alteration and redox gradients during iron precipitation and diagenesis.

The excursion started in the Zaječov quarry (N 49.76490, E 13.84747), which exposes sequence of basic volcanic rocks (basaltic andesites) including pyroclastics and submarine alteration products. Sheeted lava flows evolve into pillow extrusions and hyaloclastic breccias, which are interlayered with agglomerates and ash tuffs. There is abundant evidence for gravitational sliding and deformation at the head of volcanic accumulations. Agglomerates were formed from fragmental and ash volcanoclastics, deposited from hyperconcentrated flows sourced by Surtseyan eruption.

Our next stops, Cheznovice (N 49.76583, E 13.78056) and Holoubkov (N 49.78028, E 13.67944), are former pits and dumps, where horizons of hematite-cemented epiclastics and conglomerates were exploited. Host rocks include quartz conglomerates and sandstones with altered basalt-andesitic tuffs, both strongly impregnated by hematite. Formation of the ore mineralization was accompanied by local hydrothermal activity associated with precipitation of amorphous silica, jasper and specular hematite. Hematite may form lenses, with a grade of 35–61 % Fe. The entire sequence has probably formed in a very shallow marine environment (bay).

The remaining stops concentrated on the ferrous oolitic ironstones of the Middle and Upper Ordovician Series. The abandoned adit Josef at Zbiroh-Bukov (N 49.84306, E 13.74944) served as principal access to iron ore workings underlying the Bukov hill, where collapsed adits, ore and waste rock dumps are still easy to inspect. The ore horizon (Darriwilian Stage) is a dark grey oolitic ironstone, with 3–5 mm large ooids composed of siderite, chamosite or Fe-rich clay minerals that are disseminated in siderite-rich clay-rich matrix. The highest ore grade was 36–39 % Fe. The Chrustenice mine (N 50.00441, E 14.16490), our last stop, was in production between 1861 and 1965. An inclined oolitic iron ore horizon of the Upper Ordovician age, sandwiched between marine sandstones (Letna

Participants in the Zaječov quarry.

Ash tuff.

Formation) and shales (Vinice Formation), was accessed on 84 underground levels and 426 vertical meters (120 m below the sea level). More than 8 million tons of iron ore were mined from an 8.6 km long ore lens with a maximum thickness of 20 m. The ore horizon is spatially zoned, with the richest chamosite-magnetite ore, containing more than 40 % Fe, in the centre. Outwards, the iron content decreases and the mineral assemblage changes to chamosite ore, and, eventually, passes into siderite clay-rich ironstone with sandy admixture (25 % Fe). This iron deposit is stratiform and it formed on a slope of submarine elevation shielded from detrital input into the basin. The original precipitate was probably an iron oxide, which has been converted into Fe-rich silicates and carbonates during diagenesis.

The field trip was a great success and it gave us opportunity to examine various aspects of iron ore mineralization in sedimentary environments. We would like to thank the staff of the Zaječov quarry for granting the permission for entry and Mr. Dobry for his unforgettable tour through the Chrustenice mine.

Agglomerate.

Chrustenice mine.

Mineralization related to the Devonian crustal extension and volcanosedimentary processes in the Silesian domain, northeastern Bohemian Massif (SGA student chapter Prague)

Filip Podolský, David Dolejš, Ondřej Krátký

Faculty of Science, Charles University, 128 43 Praha 2, Czech Republic

The traditional annual fall trip of the SGA Student Chapter Prague has mainly focused on stratiform iron mineralization in the Neoproterozoic metasediments of the Desna unit and iron mineralization of the Lahn-Dill type in the Devonian volcanosedimentary cover in the Jeseníky Mts., northeastern Bohemian Massif. All geological units belong to the Silesian domain, which is a fragmented and extended margin of the Brunia microcontinent with its cover sequences. Individual ore occurrences are variably metamorphosed and deformed and we had the opportunity to traverse the tectonometamorphic gradient from high-grade paragneisses to low-grade flysch sequences and to follow the impact on ore mineralogy and structures. The 13 students participated in this exucrsion, which was lead by David Dolejs.

On the way from Prague to the Jeseniky Mts. we visited several additional mineralization styles in the Lugian zone of Poland: former magnetite-uranium-base metal district of Kowary (N 50°11'45.9"/E 16°59' 13.6"). Here, magnetite ores were mined since the 12th century and through the World War II. The mine galleries has been used as a radon spa and a tourist site. The origin of the magnetite orebody in Kowary deposit is sedimentary-exhalative, subsequently metamorphosed recrystalized within the contact aureole of the Krkonose Mts. granite pluton. The magnetite lenses are located at the contacts between marbles, skarns and amphibolites. The magnetite grains show common cataclasis and secondary cementation as well as recrystalization and martitization. Accompanying minerals are pyrrhotite and pyrite with other minor sulfides.

Our next stop was a mine dump at Czarnow (N 50°48'23.2"/E 15°55'12.9"), a Cu-As deposit in the contact aureole of the Krkonose granite pluton. This is a vein mineralization bound to contacts between schists and silicified dolomite marbles represented mainly by arsenopyrite, pyrrhotite and galena. Currently, the abandoned mine dump offers spectacular examples of

dolomite replacement, skarn formation and incipient sulfide precipitation. Economic accumulations of minerals were represented mainly by arsenopyrite.

The third point of interest in the Lugian domain was a chromite mineralization in the Gogolow-Jordanow massif (Sleza ophiolite) at the Czernicza Hill (N 50°49'47.3"/ E 16°41'51.1"). Chromite accumulations ocurrs as disseminated grains, streaks or massive pockets within the serpentinite-chlorite rock mass, which represents serpentinized ultramafic cumulates. According to low contents of TiO2 and intermediate Cr concentrations, these chromites correspond to those forming in the mid-ocean ridge settings. Although the adit is not accessible, the mine dumps offer representative samples of chromite, serpentinite and actinolite-rich host rock.

The principal destination of our excursion were the Jeseniky Mts. with their iron occurrences, which were exploited for several hundred years. The first locality of banded iron formations (BIF), Mnisske jamy (N 50°03'37.7"/E 17°12'28.9"), is situated in the Desna gneisses on one of the mountain ridges of the Jeseniky Mts., and it was mined by three small adits. Mined ore was crushed and transported by animals down to the valley for smelting. The host-rocks are paragneisses with amphibole, chlorite, and the economic ore is present as a banded magnetite-quartz horizon, approximately 30 cm thick, which was isoclinally folded during the Variscan orogeny and metamorphism.

Our next three stops were devoted to the iron mineralization in the moderately metamorphosed Devonian volcanosedimentary rocks. The adits Tobias, Melchior I and II (N 50°13'50.7"/E 17°21'20.1"; N 50°13'41.1"/ E 17°21'21.1"; N 50°13'39.5"/E 17°21'24.4") in the Zlate hory district exploited poor iron mineralization of Lahn-Dill type since the 19th century. Ore bodies are represented mainly by magnetite, stilpnomelane (type locality), chlorite with acessory ilmenite and hematite. These minerals are disseminated or present as an interlayers in host carbonate-bearing schists and greenschists. The thickness of the ore body varied between 2 and 2.5 meters, and the iron content was 45–60 wt%. These occurrences are stratigraphically similar to that at the Brutus mine (N 50°14‘02.6“/ E 17°17‘33.0“), our next stop, where it is still possible to access the adit and follow the massive (50 cm) magnetite layer. The ore layer is hosted in the carbonate-bearing epidote-biotite schists, which are strongly sheared and banded texture. The rock sequence is intersected by Alpine fissure veins, 2–3 cm thick, predominantly filled with calcite, quartz, feldspar and some hematite. The third stop, a metamorphosed magnetite mineralization of the Lahn-Dill type at Leiterberg (N 50°06'47.7"/E 17°12'47.8"), was discovered during magnetometric survey in 1926 and opened by a 40 m long adit. The adit exploited magnetite lens in the NW-SE direction, 300 m long and 3 m thick within the low-grade metasediments. Although the adit has partly collapsed, the iron ore with 39.7 % Fe is still stocked near the adit entrance and has never been shipped due to the remote location of the deposit.

Our additional stops were situated near the Sobotin metamorphosed mafic-ultramafic intrusion near the Vernirovice village. At Hofberg (N 50°01'41.1"/E 17°06'24.2") we examined traces of exploration for manganiferous calcic skarn. The skarn body is only documented by loose rock fragments and it is probably located within amfibolites and amphibolite-rich gneiss. The skarn is rich in spessartine, plagioclase, epidote and quartz. Just a few kilometers to the northeast, we visited the abandoned talc and soapstone quarry at Zadni Hutisko (N 50°02'48"/ E 17°10'22"). This is an example of one of the three metamorphosed ultrabasic bodies with reaction zones against the amphibolite host rock. The zoning is documented, from the margin to the interior, by chlorite schist, actinolite schist, talc schist (soapstone), massive talc and dolostone. The entire lens of magnetite-bearing serpentinite is 35 thick.

We have concluded our excursion at the southern margin of the Sternberk-Horni Benesov belt near the village of Krakorice (N 49°44'39.0"/ E 17°16'54.1"). This is a Devonian submarine-exhalative volcanosedimentary sequence with spillites, diabases and their pyroclastic products. The iron mineralization appears at the contacts between basic volcanics (pyroclastics) and overlying clastic sediments in the form of 1–4 m thick lenses). The ores were only weakly deformed and metamorphosed, producing jasper-like poor ores (hematite, magnetite and red-colored quartz) or iron-chlorite silicate ores. These occurrences were mined since the first half of 17th century till the half of the 20th century.

The main part of the excursion was designed as a transsect across the metamorphic and deformation gradient imposed on the same iron-bearing precursor of the Lahn-Dill type. We have thus investigated transition from jaspilites to metamorphosed magnetite ores as well as their banded magnetite-quartz counterparts. This provided many interesting examples, based on a number of small historically mined occurrences.

Photos illustrating (a) BIF from Mnisske jam (Jeseniky Mt.), (b) Jasper like ore, (c) Spessartine rich skarn, (d) Talc from Zadni Hutisko.

SGA worshop on gold in the epithermal environment organized by the Barcelona SGA Student Chapter

Sandra Baurier Aymat, Lisard Torró i Abat

Facultat de Geologia, Universitat de Barcelona, Barcelona, Catalonia (Spain), sandrabaurier@gmail.com; lisardtorro@hotmail.com

2014 was a year full of timeless memories; enhancing experiences and knowledge broadening activities related to Ore Deposits. Given to last year's success on the SGA workshop on mineral deposits related to acid magmatism, the enrollment of new members and the motivation of the entire Chapter, we were deeply enthusiast and encouraged to organize our third workshop, this time devoted to Epithermal Ore Deposits, from the 18th to 20th of September. It was held at the faculty of Geology of the University of Barcelona and counted with the total participation of 75 assistants, some of them even coming from Madrid and Granada. The aim of this workshop was to approach and provide a highly-developed survey about these deposits; the structure and formation of both high and low sulfidation epithermal deposits, their geochemistry, mineralogy, petrology and their economic interest to undergraduate, master, doctorate and young research students, as well as to professors, researchers and professional geologists, who were interested in these characteristic deposits and wanted to up-date their knowledge with the latest research on this topic.

The first day of the workshop consisted of a stimulating two-hour introductory class imparted by Antonio Arribas Jr, under the title of "Introduction to epithermal gold deposits and their classification". This lesson was of great profit for students who were non-familiarized with this kind of deposit, due to its straight forward explanation and introduction to their basics. It included one hour of theory and another one of practical lesson, where members could learn how to recognize in hand sample the different alterations of high and low epithermal deposits (Fig. 1). Furthermore, petrographic microscope with reflective light was used to visualize the ores of these ones (Fig. 2). The samples used to carry out the practical lesson came from the Faculty of Geology's wide collection and from Antonio Arribas itself, who kindly provided some of the spectacular samples he had the opportunity to pick up in the diverse deposits he had worked in.

The second day of the workshop held the enlightening lectures given by the invited speakers, recognized International experienced specialists on these type deposits (Fig. 3). Dr. Antoni Camprubí i Cano (Universidad Nacional Autónoma de México-UNAM) opened the session with "Mechanisms for ore deposition in epithermal depòsits", throwing light upon the complex processes undergoing in these types of deposits, including boiling, conductive cooling, fluid mixing, etc. Moving on to more specific and detailed topics inside epithermal deposits, Dr. Antonio Arribas Jr. (Ann Arbor, Michigan), with his lecture entitled "Au-Ag-Cu high sulfidation epithermal deposits and their relationship to Cu-Au porphyry Systems", illustrated the structure, alteration distribution and how high sulfidation processes relates to porphyry Systems. Emphasizing and making clear the difference between high sulfidation deposits and intermediate sulfidation ones, Dr. Antoni Camprubí i Cano (Universidad Nacional Autónoma de México-UNAM), declaimed again, but this time with a talk under the name of "How intermediate sulfidation epithermal deposits make sense", also explaining in detail the characteristics which allows us to differentiate between them and depicting essential exploration guidelines. Finally, Dr. Isaac Corral Calleja (James Cook University, Australia & Universitat Autònoma de Barcelona), with a talk entitled "The Cerro Quema Au-Cu deposit, Azuero Peninsula (Panama): An example of a high sulfidation deposit in a fore-arc environment", exposed the outcomes he obtained from this

Fig. 1. Antonio Arribas Jr in action during the hands-on session. Part of the samples for this session was contributed by Antonio from several epithermal deposits he has worked at.

Fig. 2. The ore identification by reflected light session was led by Antoni Camprubí and Joaquin A. Proenza.

Fig. 3: Antoni Camprubí during his first dissertation in the main hall of the Faculty of Geology of the University of Barcelona.

Fig. 5: Students in one of the ancient mines observing the milky quartz lode containing ore mineralization.

particular study case and described the experience he underwent whilst studying one of this type of deposits.

To enliven and offer a relaxed and friendly environment, an afternoon snack was provided at the Faculty's courtyard after the conference sessions, consisting of diverse groceries, mojitos and the music our members bought in. Students enjoyed the opportunity to initiate a closer conversation and agreeable discussions with the attendants to the conferences, asking any doubts about the lectures and sharing their points of view.

On Saturday 20th, a one-day fieldtrip to different iron mines in Les Bordes de Conflent took place. Led by our PhD student member, Marc Campeny (Fig. 4), who acknowledged the mineral deposits of this region in Lleida, all attendants had great pleasure in listening to diverse explanations as the cause of mineralization in this area. Furthermore, we could distinguish copper sulfosalts (tennanite-tetrahedrite), arsenopyrite, pyrite and chalcopyrite mineralizations containing gold associated to shearing in the Pyrenees; the reasons why these mineralizations are largely classified as orogenic gold deposits were exposed and discussed (Fig. 5). In addition, attendants were delighted and extremely relished to take part in a fieldtrip to one of the most beautiful landscapes the Pyrenees offers us. Student members were greatly involved and the lecturers took great appreciation of this participation – leading to a wonderful atmosphere (Fig. 6). What's more; we had the opportunity to find and pick up exceptional hand samples with idiomorphic tetrahedrite crystals, as well as acquire a full comprehension of functioning of the mineralized system.

Fig. 6: Group photo in les Bordes de Conflent.

Fig. 4: Marc Campeny explaining the genetic relation between the thrust and normal faults and the different types of ore mineralization in the area.

We gratefully acknowledge all lecturers: Dr. Antoni Camprubí i Cano, Dr. Antonio Arribas Jr. and Dr. Isaac Corral Calleja for their overwhelming speeches, their deep motivation and interest in forming part of our third workshop, to everybody who was involved in it and gave us support. We also express our most true gratitude to the SGA for the economic support offered, which allowed us to develop and carry out successfully all our activities. We would also like to thank the Faculty of Geology for their logistic and economic support, as well as to the SEG, for its collaboration in the process of organization.

We would like to remind that for any more information feel free to consult our Student Chapter checking out our page web http://bcn-sga.cat.

>>> FORTHCOMING EVENTS <<<

*** marks a new entry**

2015

***January 25–28**
2nd Euro-Asia Zeolite Conference, Nice, France. Contact: http://www.euroasia2015.org

***January 31–February 7**
IECs-2015 – International Eclogite Conferences, Punta-Cana, Dominican Republic. Contact: http://www.ruhr-uni-bochum.de/eclogite/iec11.html

***February 25–27**
GeoFluids 2015, Austin, Texas, United States. Contact: http://www.beg.utexas.edu/geofluids/meetings.php

***February 23–27**
Physics of Exoplanets: From Earth-sized to Mini-Neptunes, Santa Barbara, United States. Contact: http://www.kitp.ucsb.edu/for-scientists/programs-conferences

***March 18–21**
PACRIM 2015, Hong Kong, China. Contact: http://www.pacrim2015.ausimm.com.au/

***March 23–27**
Fourth International Geoscience Conference Tyumen 2015, Tyumen, Russia. Contact: http://eage.ru/ru/conferences/detail.php?id=101

***April 12–15**
MWS15 – Mine Water Solutions in Extreme Environments, Vancouver, Canada. Contact: http://www.minewatersolutions.com

***April 21–24**
ICARD – IMWA 2015 – International Conference on Acid Rock Drainage and International Mine Water Association Conference, Santiago, Chile. Contact: http://www.icard2015.com/english/about-icard-imwa/icard-imwa-2015

***April 23–26**
Clay Conference 2015, Brussels, Belgium. Contact: http://www.clayconferencebrussels2015.com/

***May 3–7**
AGU-GAC-MAC-CGU Joint assembly 2015, Montreal, Canada. Contact: http://ja.agu.org/2015/

***May 16–20**
46th Lunar and Planetary Science Conference, The Woodlands, Texas, United States. Contact: http://www.hou.usra.edu/meetings/lpsc2015/

***May 18–19**
Tethys-Atlantic interaction along the European-Iberian-African plate boundaries, Lisbon, Portugal. Contact: https://europeevents.aapg.org/ehome/index.php?eventid=90332&

***May 31–June 3**
AAPG 2015 Annual Convention & Exhibition, Denver CO, United States. Contact: http://www.aapg.org/meetings/

***June 7–12**
Gordon Research Conference – Interior of the Earth 2015, South Hadley, United States. Contact: http://www.grc.org/programs.aspx?id=12544

***June 7–12**
AMAM 2015 – International Conference on Applied Mineralogy & Advanced Materials, Castellaneta Marina, Italy. Contact: http://www.amam2015.org/

***June 28–July 2**
ZMPC 2015 – International Symposium on Zeolites and MicroPorous Crystals, Sapporo, Japan. Contact: http://www.zmpc.org/

***July 5–10**
Euroclay 2015, University of Edinburgh, United Kingdom. Contact: http://www.minersoc.org/euroclay.html

***July 13–17**
ISAES 2015 – International Symposium on Antarctic Earth Science, Vasco da Gama, India. Contact: http://www.ncaor.gov.in/files/ISAES-2015Flyer1.pdf

***July 26–29**
Gold 2015 World Conference, Cardiff, United Kingdom. Contact: http://sites.cardiff.ac.uk/gold2015/

August 16–21
2015 Goldschmidt Conference, Prague, Czech Republic. Contact: http://www.geochemsoc.org/programs/goldschmidtconference/

August 24–27
13th SGA Biennial Meeting "Mineral Resources in a Sustainable World", Nancy, France – Contact: sga-2015@univ-lorraine.fr, http://www.e-sga.org/index.php?id=5

***September 13–16**
International Symposium on Knappable Materials 2015, Barcelona, Spain. Contact: http://www.ub.edu/cherts-symp2015/

September 20–25
8th Hutton Symposium on Granites and Related Rocks, Florianópolis, Brazil. Contact: http://www.hutton8.com.br

***September 21–25**
AIG-11 – Applied Isotope Geochemistry Conference, Orléans, France. Contact: http://aig11.brgm.fr

***October 31–November 3**
2015 Geological Society of America (GSA) Annual Meeting, Baltimore, Maryland, United States. Contact: http://www.geosociety.org/meetings/2015/

November 1–5
Geological Society of America Annual Meeting, Baltimore, MD, United States. Contact: http://www.geosociety.org/meetings/

***November 3–5**
FEM – 10th Fennoscandian Exploration and Mining, Levi, Finland. Contact: http://fem.lappi.fi/en

***December 7–12**
International School on Geothermal Exploration, ICTP Trieste, Italy. Contact: http://www.ictp.it/scientific-calendar.aspx?start_date=01/01/2015&end_date=31/12/2015

***December 14–18**
2015 AGU Fall Meeting, San Francisco, United States. Contact: http://meetings.agu.org/

2016

February 15–June 17
Melt in the Mantle, Isaac Newton Institute for Mathematical sciences, Cambridge, United Kingdom. Contact: http://www.newton.ac.uk/programmes/MIM/

June 26–July 1
2016 Goldschmidt Conference, Yokohama, Japan. Contact: http://www.geochemsoc.org/programs/goldschmidtconference/

***August 27–September 4**
35th International Geological Congress, Cape Town, South Africa. Contact: http://www.35igc.org/

***September 25–28**
The Geological Society of America (GSA) 2016 Annual Meeting, Denver, United States. Contact: http://www.geosociety.org/meetings/

2017

***October 22–25**
The Geological Society of America (GSA) 2017 Annual Meeting, Seattle, United States. Contact: http://www.geosociety.org/meetings/

Report on the 3rd SGA Short Course on African Metallogeny „Mining in Africa"

Alain Cheilletz

GeoRessources Laboratory, University of Lorraine, Nancy, France

The third edition of the SGA-SEG-UNESCO-IUGS Short Course on African Metallogeny was co-organized by SGA and MANAGEM. It was held in Marrakech, Morocco, from September 29th to October 3rd at the Hotel Kenzi Farah. 74 delegates from 9 countries in Africa and Europe (Morocco, Senegal, Nigeria, Cameroun, Soudan, RD Congo, Guinea, Benin, France) attended the Short Course with a predominance of Moroccan delegates. Relatively to the two precedent short courses (Ouagadougou 2012 and Kitwe 2013), the Marrakech edition was extended to mining exploitation and R&D initiatives in the mining industry. A large place was also devoted to human resources management in the mining industry, particularly based on the African experience of MANAGEM. One of the main goals of the Course was to integrate a majority of local specialists in the pool of presenters. This results in the participation of 13 Moroccan professionals over a total of 21 lecturers (not including the leaders of the field trips, who are affiliated to Managem and OCP). Local presenters came in majority from MANAGEM, then ONHYM, Faculty of Sciences-University of Oujda, Faculty of Sciences and Technology-Marrakech. Abroad presenters originated from GeoRessources Laboratory Nancy (4), Ecole des Mines of Nancy (2) and Ecole des Mines of Paris (1), France. The participants were divided into two groups (Mining exploitation and Metallogeny) except for Day 1, the phosphate field trip and the day 4 AM. All lectures were done in French with a very efficient simultaneous English translation by VIP Events from Marrakech. All participants beneficiated from course materials provided on a USB Key including all the presentations. The proposed program was fully respected, with some minor changes relatively to the second circular i.e.:

Aicha Quechai (MANAGEM), Anne-Sylvie André-Mayer (GeoRessources) and Mohamed Bouabdellah (Regional Vice-President for North Africa and Middle West) presenting SGA at the booth in the Kenzi Farah hotel

The Program

Day 1 Monday 29/09/2014

Morning

1 Recent Mining developments in Africa: A. Saquaque (MANAGEM)
2 Globalisation and world mining industry: A. Cheilletz (GeoRessources Nancy)
3 Smart technologies for the mining industry : M. Assara (MANAGEM)

Afternoon

4 The WAXI project; main contributions for the West African countries mineral exploration: A.S. André (GeoRessources Nancy)
5 Mineral resources of Morocco: M. Zouhair (MANAGEM)
6 Management of Human Resources in the mining industry in Africa : K. Fahmi (MANAGEM)

Day 2 Tuesday 30/09/2014

1 Underground Cu-Zn-Pb Mine visit (Draa Sfar, MANAGEM)
2 Industrial complex and R&D Center of Guémassa (MANAGEM)

Day 3 Wednesday 1/10/2014

Morning

Underground mining session

1 Background for underground excavation stability calculation : Y. Gunzburger (Ecole des Mines Nancy)

Afternoon/Après-midi

2 Mining methods at MANAGEM : M. Sellami (MANAGEM)
3 Numerical modelling for underground mining: T. Verdel (Ecole des Mines Nancy)

Metallogeny session

1 Exploration modeling : L. Maacha (Coord.) and M. Zouhair (MANAGEM)
Resource and reserve reporting codes : A. Smouh (MANAGEM)
Geophysical exploration : new technologies and methods : M. Jaffal (Université Cadi Ayad Marrakech)
The use of teledetection in mining exploration : A. Hamzaoui (ONHYM)

Dr. Driss Mounji sharing his experience on practises in mining activities in Africa. On the stage from left to right : Dr. Ali Saquaque, I. Benzakour and L. Lbouabi from MANAGEM.

Delegates in front of a giant dragline at the Benguerir (OCP) phosphate deposit.

Afternoon

2 Orogenic gold : A.S. André (GeoRessources Nancy)
Gold fundamentals; geochemistry of gold; characteristics of gold deposits; gold mining economics; orogenic gold deposits in Africa

3 Analytical tools used in the field : J. Cauzid (GeoRessources Nancy)

Day 4 Thursday 2/10/2014

Morning

Mining exploitation session

1 Open pit Mining : J.A. Fleurisson (Ecole des Mines Paris)

Afternoon

2 Sustainable mining development: M. Benzakour (MANAGEM)

3 Security and work conditions in Mine Exploitations : M. Lhouabi (MANAGEM)

4 Practises in mining activities in Africa : D. Mounji (MANAGEM)

Metallogeny (Morning)

1 Pb/Zn deposits in sedimentary basins : M. Bouabdellah (Faculty of Sciences, Oujda University)

Afternoon

2 Uranium in Africa : M. Cuney (GeoRessources Nancy)

Day 5 Friday 3 /10/2013

Visit of the Benguerir phosphate deposits at OCP (Office Chérifien des Phosphates)

Conclusions and perspectives

This third edition of the SGA-SEG-UNESCO-IUGS Short Course on African Metallogeny was for the first time open to underground and open pit mining practises. This challenge was successfully reached by the presence of 30 delegates during the Mining sessions. With a total of about 80 delegates from 9 different countries, this third edition proves that there is a continuous demand for this kind of meeting between professionals of the mining industry engaged in African projects. Additionally, the specific questions related to exploration and mining opportunities in Africa (local mining laws, industrialisation links with mining operations, training of local professionals, politic

Part of the scientific committee of the third SGA-SEG-UNESCO-IUGS Short Course on African Metallogeny. From left to right : Dr. K. Fahmi, A. Saquaque and M. Zouhair from MANAGEM. On the banner, the precious sponsor of the Short Course.

Dr. A. Mouttaqi, Director of Exploration and Technologies at ONHYM presenting his last book on the transformations of the world mining sector.

A very efficient simultaneous English translation offered by VIP Events form Marrakech.

Professor Anne-Sylvie André-Mayer (GeoRessources) sharing her experience on orogenic gold deposits in Africa.

Some of the delegates gathering for a family photo in front of the lecture rooms at the Kenzi Farah Hotel, location of the Short Course.

An enthusiastic Mohamed Bouabdellah explaining the metallogeny of lead-zinc deposits in sedimentary basins.

A strong interaction with the participants and some warm and stimulating discussions conducted by (left to right) Saa Lolo Koundouno (Master Student from Guinea), Mboumi Njoujip Timothee Levis (BOCOM Group from Cameroun), Professor Abdou A1ziz Ndiaye form University of Dakar (Sénégal), Dr. Abdulrazak Garba, Deputy Director at the Nigerian Geological Survey.

stability, inter-African economic exchanges and development) constitutes very hot subjects which have been largely debated during this Short Course. The introduction of these transversal activities gave a complete picture of the mining industry to the participants and made understandable the relationships between them.

The success of such a Short Course lies not only in the hands of the SGA course coordinator, but is largely dependant of the cooperation and efficiency of a local partner. This has been fully the case of the MANAGEM group, represented in Marrakech by Dr. Lhou MAACHA, General Director of exploration and development, with a very efficient collaboration of Mrs Aicha QUECHAI, Assistant-Director. The collaboration of ONHYM (Office national de Hydrocarbures et des Mines, Geological Survey of Morocco), OCP (Office Chérifien des Phosphates), Faculté des Sciences-University of Oujda, Faculté des Sciences et Techniques of Marrakech (FST) were also very appreciated for their up-to-date presentations. OCP organised a very attractive filed trip in the Benguerir Phosphate deposit with a large presentation of spectacular mining extraction activities of the open pit operations and a field reconnaissance of the geological characteristics of this giant phosphate deposit. We also acknowledge Mrs Véronique Ernest (GeoRessources) for her efficiency during the circulars preparation and the four Graduate Students of the FST Marrakech (Mrs Amal El Arbaoui and Mr Abdelmalek Ismaili Alaoui, Saa Lolo Koundouno, Fortune Tulomba Niemba) for their enthusiastic logistic help during the Course.

The idea of organizing a field trip at the beginning of the Short Course (day 2) was much appreciated by the delegates. An interesting presentation of underground mining techniques was undertaken by MANAGEM on its mine of Draa Sfar, which permitted a strong interaction between the presenters and the participants of the Mining Session during the following courses in Marrakech. A specific geological cross-section of the VMS Draa Sfar deposit was also organised by MANAGEM for the Metallogeny group. This was done at the level – 1100 m of the mine, which represented a first underground experience for some of the participants. All the delegates benefitted from the visit of the industrial complex of Guemassa, with its R&D unit, the geometallurgy plant and hydrometallurgy facilities (Co cathode elaboration), and the analytical laboratory of the group.

A group of delegates entering the shaft for a dive to - 1000 m in the Draa Sfar Mine.

With the attraction of more than 20 new members, this Short Course appears also very positive for the international exposition of SGA.

The sponsoring of IUGS, SEG, ONHYM (presenters), and OCP (Phosphate field trip organization) is much appreciated and we hope this can continue in future Short Courses.

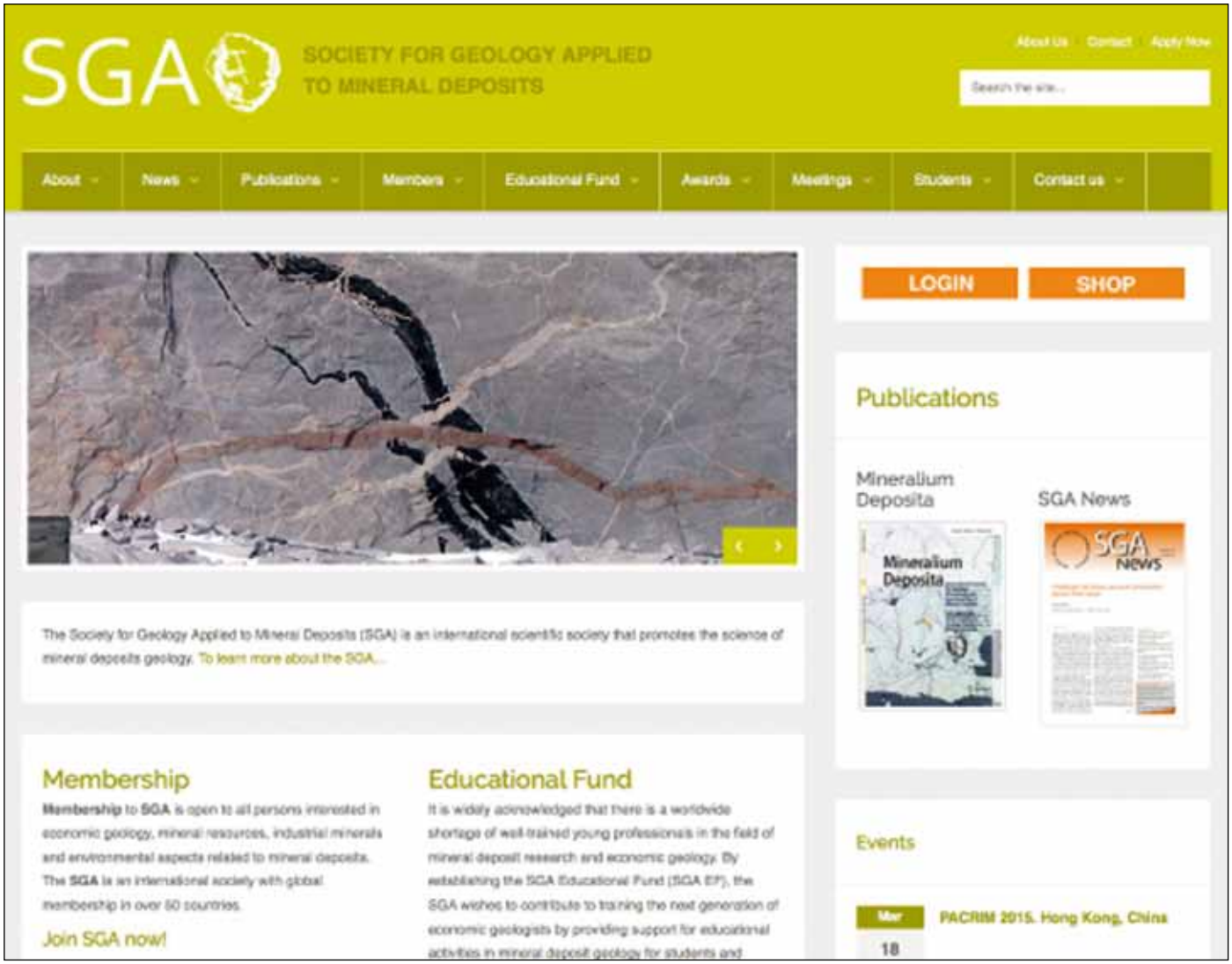
MANAGEM was a very efficient partner by providing excellent logistic support. Their collaboration in similar courses in Africa is hoped for, particularly because of its strong involvement in exploration projects in several countries as Gabon, Soudan, Ethiopia. As expressed by H. Frimmel in his report of the first SC held in Ouagadougou (SGA NEWS, Nb 31, June 2012), the economic achievement of this operation is possible if delegates from industry cross-subsidize with their course fees those delegates who do not have access to sufficient funds. This was the case for the Marrakech Short Course where 6 private exploration groups (including MANAGEM) or individuals supported most of the funding of the Course. However, the number of exploration industry companies was less than expected, compared to the two previous courses.

Contacts for the founding of Student Chapters in Marrakech (FST) and Cameroun (University of Yaoundé 1) have been established. African graduate students proved again during this Short Course, their high motivation for geology and mining industry in Africa. As already proved by the two precedent Short Courses, universities and mining companies are open for the further development of SGA in Africa.

The SGA website

Nikola Koglin , Chief Editor SGA website
Lehrstuhl für Geodynamik und Geomaterialforschung, Julius-Maximilians-Universität Würzburg, Am Hubland, 7074 Würzburg
email: nikola.koglin@uni-wuerzburg.de

http://www.e-sga.org



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SGA Educational Fund

"Training the next generation of economic geologists to discover mineral deposits"

It is widely acknowledged that there is a worldwide shortage of well-trained young professionals in the field of mineral deposit research and economic geology. By establishing the SGA Educational Fund (SGA EF), the SGA wishes to contribute to training the next generation of economic geologists by providing support for educational activities in mineral deposit geology for students and professionals from economically disadvantaged backgrounds. This includes participation to national and international scientific meetings, field trips, workshops, short courses or other related activities organized or sponsored by the SGA.

Your contribution to the SGA Educational Fund will help achieve these objectives. The donation levels are as follows: Diamond (€ 10,000 or more), Platinum (€ 5,000 to 9,999), Gold (€ 2,500 to 4,999), and Silver level (€ 1,000 to 2,499). Contributions will be acknowledged in SGA News, the SGA website and at SGA's Biennial Meetings for a period of one year.

To show how serious SGA Council is about the implementation of this educational initiative, SGA has already contributed € 70,000 towards the SGA Educational Fund. We ask all in the mining and exploration industry to meet this challenge and contribute to the SGA Educational Fund – a worthwhile investment into the future of your enterprises. To learn more about how you and/or your company can contribute to SGA EF, support the next generation of economic geologists, and push forward the future of mineral industry please visit our website at https://www.e-sga.org and/or contact...

Georges Beaudoin
SGA President
Georges.Beaudoin@ggl.ulaval.ca

Hartwig Frimmel
SGA and SGA EF Treasurer,
hartwig.frimmel@mail.uni-wuerzburg.de

Jorge Relvas
SGA VP, Chairman of SGA EF Committee
jrelvas@fc.ul.pt

Jan Pasava
SGA Executive Secretary
jan.pasava@geology.cz

OBITUARY

Günther Friedrich 1929–2014

After a protracted time of illness Prof. Günther Friedrich (Aachen) passed away on 24th of November. Born in Stuttgart on 15th April 1929, he commenced his studies in mineralogy and geology at his home university and obtained his PhD at the University of Heidelberg in 1954 under the guidance of "Erzvater" Paul Ramdohr. Subsequently, he joined the RWTH Aachen University as assistant professor where he earned his Habilitation in 1962.

Günther Friedrich has dedicated his life to bringing standards of excellence to the profession of economic geology and his distinguished career reflects the diversity and impact of the subject.

After spending two years as visiting scientist at the Universities of Rolla, Missouri, and Berkeley, California, and with the U.S. Geological Survey in Denver as well as the Geological Survey of Canada in Ottawa, he returned to Aachen where he accepted the position of professor and head of the Division of Applied Ore Deposit Research. Recognizing a gem, RWTH Aachen University appointed him in 1975 as professor to the chair of mineralogy and economic geology and director of the institute. In August 1994, he became "actively retired" from the university and was awarded the title of Professor Emeritus for more than 30 years of dedicated service.

Günther Friedrich's tenure was distinguished by extensive service to the Earth science community, including membership on the Earth Science Committee of the Deutsche Forschungsgemeinschaft, and several offices in the Society of Geology Applied to Mineral Deposits including presidency in 1982–1984. He was also instrumental in the inauguration of the German Forschungskollegium Lagerstätten in 1988. He has served for many years on the council of the German National Committee for the Geological Sciences to the IUGS and was President and Vice-President of the Deutsche Mineralogische Gesellschaft in 1990–1993, and still acted as Editor of the Monograph Series on Mineral Deposits until now. In the process he has forged important international ties through his active participation in international Earth science committees and collaborative research projects in Europe, Canada, the Philippines, Brazil, and southern Africa.

Günther Friedrich's knowledge of ore deposits was extensive and his remarkable ability of homing in on fundamental problems in the field of economic geology has resulted over the years in a wide range of research interests. For many years, he focused on the development of specific methods for geochemical exploration including the use of mercury as a pathfinder element in the search for various types of sulfide ore deposits. In recent years, this method was applied by environmental geochemists in detecting and mapping areas contaminated by mercury. Much of his scientific life, however, was dedicated to the study of marine mineral deposits and there is no doubt that Günther Friedrich was a pioneer in manganese nodule research. Numerous cruises to the manganese nodule areas of the Pacific Ocean, including the Central Pacific Nodule Belt, the Southwest Pacific and the Peru Basin were planned and carried out under his scientific guidance. Other topics of Günther Friedrich´s research include the mineralogy and geochemistry of the Kupferschiefer deposits, the study of laterite deposits and their gold, chromium and nickel potential, the formation of alkaline rocks and associated ore deposits as well as the genesis of epithermal gold deposits.

Within the German Continental Deep Drilling Project, Günther Friedrich took an active role in the study of ore mineralogy and in developing models for ore formation in metamorphic rocks. The formation of ore deposits by intraformational processes was the subject of a long term priority research program coordinated by him and funded by the Deutsche Forschungsgemeinschaft. In close cooperation with the Bundesanstalt für Geowissenschaften und Rohstoffe, Günther Friedrich and his students participated in the program Gold metallogenesis in Africa during which an economic, currently exploited gold deposit was discovered as a result of systematic research.

The results of Günther Friedrich´s scientific achievements have been summarized in more than 200 publications and 70 conference abstracts all of which reflect his broad scientific interests in the fields of mineralogy, geochemistry, ore microscopy and economic geology in general. His enthusiasm and his almost endless energy have been the driving force not only for him but also for many of his students, some of whom are now leading professionals in many different parts of the world.

Those of us who were privileged to work with Günther Friedrich remember him for his modesty, his generosity, and his dedication to his science, students, and colleagues.

Franz Michael Meyer
Institute of Mineralogy and Economic Geology
RWTH Aachen University
D-52062 Aachen
Germany

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SGA

Society for Geology Applied to Mineral Deposits (www.e-sga.org)

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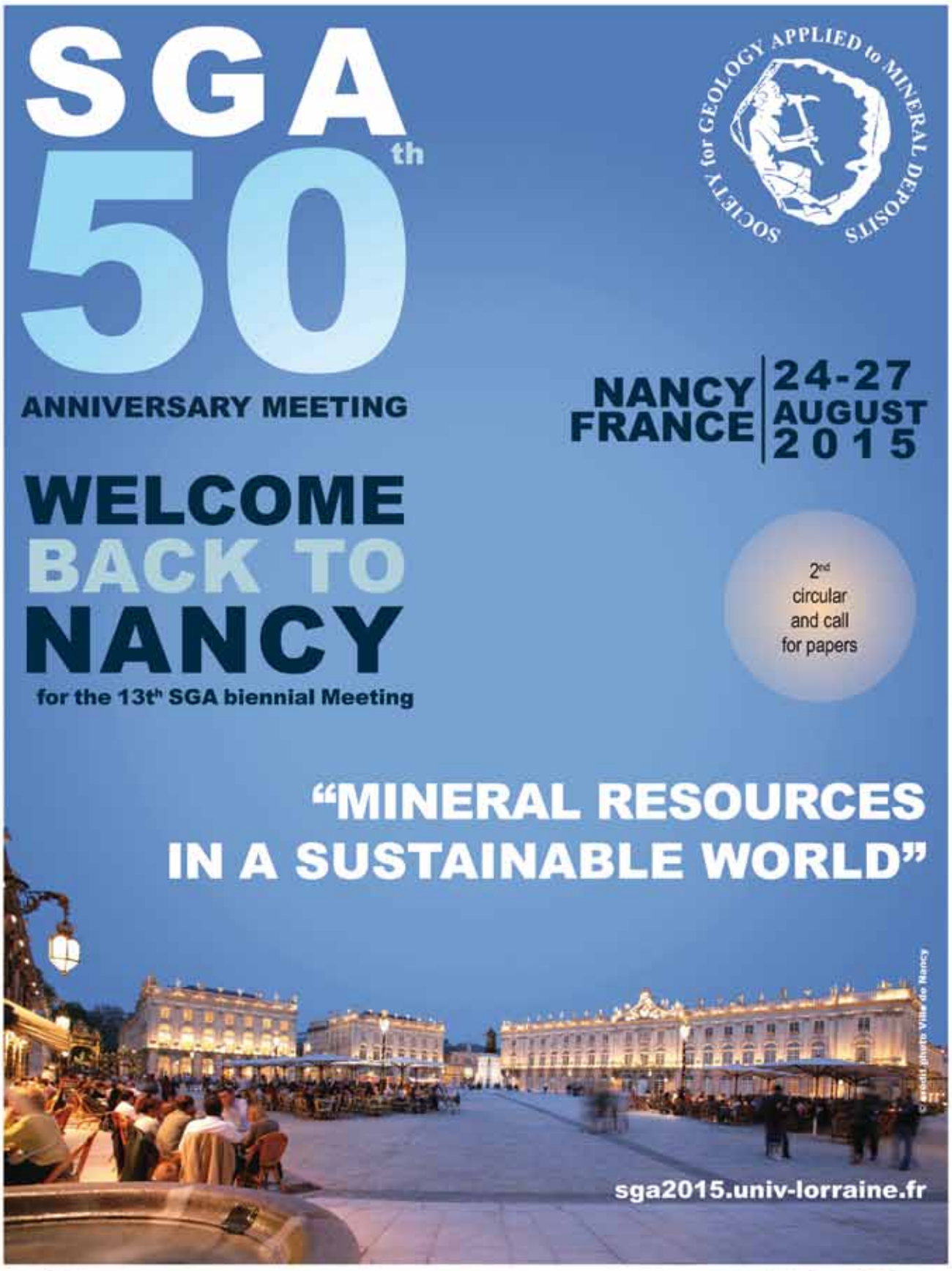
Send the Membership Application Form to:
Dr. Jan Pasava,SGA Executive Secretary, Czech Geological Survey, Klárov 131/3, CZ-118 21 Praha 1, CZECH REPUBLIC
Phone: ++(420)-2-51085506, Fax: ++(420)-2-51818748, e-mail: secretary@e-sga.org.


SGA
50th
ANNIVERSARY MEETING
SOCIETY for GEOLOGY APPLIED to MINERAL DEPOSITS
NANCY FRANCE
24-27 AUGUST 2015
WELCOME BACK TO NANCY
for the 13th SGA biennial Meeting
2nd circular and call for papers
"MINERAL RESOURCES IN A SUSTAINABLE WORLD"
sga2015.univ-lorraine.fr
UNIVERSITÉ DE LORRAINE
RWTH AACHEN UNIVERSITY
KATHOLIEKE UNIVERSITEIT LEUVEN
Université de Liège
cnrs

INVITATION

It is with great pleasure that we warmly invite you to the 13th SGA Meeting in Nancy!

Ever since the first edition in Nancy in 1991, the biennial SGA meetings have continued to provide excellent opportunities to present and exchange knowledge within the field of mineral deposit research.
The 13th SGA meeting will be organized by the CNRS and a consortium of French, Belgian and German universities: Lorraine, Liège, Aachen and Leuven. The focus for this 13th edition will be on "Mineral Resources in a Sustainable World".
The SGA was founded in 1965 in Heidelberg and the 2015 SGA meeting will celebrate the 50th anniversary of the Society!

The meeting will take place at the Nancy Centre Prouvé in Nancy city center from the 24th to 27th of August 2015.

VENUE

Nancy, city of art and culture

The former capital of the dukes of Lorraine, Nancy, has a rich heritage. The eighteenth-century heart of the city is a UNESCO World Heritage site and includes the famous Place Stanislas, one of the most beautiful squares in the world. Nancy is also one of the birthplaces of Art Nouveau, in the form of the Ecole de Nancy, and hosts museums presenting outstanding works by Gallé, Daum, Majorelle, Prouvé and Vallin.
Live performances, terraces and bars, renowned restaurants and more unusual eateries – the city offers all the fun-filled creative energy associated with a leading university town and its 45,000 students!

Several brochures can be found on-line to help you prepare your escape: en.nancy-tourisme.fr/practical-info/download-brochures/

The Centre Jean Prouvé was inaugurated in the summer of 2014. The new 20,000 m^2 congress centre offers highly adaptable and functional conference space, hosts state-of-the-art facilities and equiment, and has been designed to meet the most demanding needs of its clients.
The Centre Prouvé is ideally located in the heart oh Nancy, just one minute from the TGV train station and in immediate proximity to a large hotel offer.

SCIENTIFIC SESSIONS AND SYMPOSIA

16 scientific sessions and 5 symposia are proposed for the next SGA2015 and the call for abstracts is now open. On-line submission will be open from 15th January to 28th February 2015.

SCIENTIFIC SESSIONS

- 1. Geodynamics, orogenic cycles and mineral systems
- 2. Porphyry and epithermal deposits
- 3. Fluids and ore genesis
- 4. Developments in elementary and isotope geochemistry, source tracing and geochronology
- 5. Strategic metals: their sources, and ore-forming processes
- 6. Platinum-Group-Element (PGE) and chrome deposits: ore-forming processes and host-rock environments
- 7. REE and other mineralization associated with carbonatites and alkaline rocks
- 8. Iron ores including IOCG
- 9. Organic matter and ore deposits: where the molecular world meets the mineral
- 10. Concentration processes in sub-surface environments
- 11. Marine mineral resources
- 12. Gems and industrial minerals
- 13. Processing of low-grade ore deposits
- 14. Geometallurgy
- 15. Phytomining strategic metals and other elements from naturally mineralized soils and mineral wastes
- 16. Sustainable mining and environmental issues
- 17. Open session

SYMPOSIA

- A. Metallogeny of North and West Africa
- B. 3D modeling - in honour of J.L. Mallet
- C. Uranium deposits - in honour of Michel Cuney
- D. Sediment-hosted deposits - in honour of Jan Pašava
- E. Volcanogenic Massive Sulfide ore deposits - in honour of James Franklin

WORKSHOPS

Seven workshops are already proposed for the next SGA2015.
If you would like to organize a complementary workshop during the next SGA 2015, please contact us at: sga-2015@univ-lorraine.fr.

New proposals will be considered until the 10th January, 2015.
Proposals for workshops that focus on a specific type of deposit are warmly welcomed.

- WORKSHOP 1. **Structural geology**
2 days – Pre-meeting workshop – 22nd and 23rd August 2015
cbonson@srk.co.uk

- WORKSHOP 2. **Intensive course in geophysics: gravimetry and magnetometry applied to exploration**
2 days – Pre-Meeting workshop – 22nd and 23rd August 2015
lyal_harris@ete.inrs.ca

- WORKSHOP 3. **Agromining: from soils to refined metal products**
2 days – Pre-Meeting workshop – 22nd and 23rd August 2015
guillaume.echevarria@univ-lorraine.fr

• WORKSHOP 4. **Spectroscopies for field work**
2 days – Pre-Meeting workshop – 22nd and 23rd August 2015
Contact : jean.cauzid@univ-lorraine.fr

• WORKSHOP 5. **Fluids and metals**
2 days – Pre-Meeting workshop – 22nd and 23rd August 2015
Contact : jean.dubessy@univ-lorraine.fr

• WORKSHOP 6. **Modeling mineral deposits in 3&4D**
3 days – Pre-Meeting workshop – 21st to 23rd August 2015
Contact : royer@gocad.org

• WORKSHOP 7. **Latest advances on the understanding of the genesis of Ni-Cu-PGE mineral systems and associated review of exploration targeting**
1 day - Pre workshop meeting - 23rd August
Contact : marco.fiorentini@uwa.edu.au

FIELD TRIPS

• FIELDTRIP 1. **Pb-Zn deposits of the Vardar Zone, Kosovo**
3 or 4 days - Post-conference - Starting point: Prishtina International Airport Adem Jashari
Leaders: J. Pršek and J. Kołodziejczyk - prsek@geol.agh.edu.pl

• FIELD TRIP 2. **Precious and base metal deposits in Anti-Atlas and Hercynian belts, Morocco**
6 Days - Post-conference - Starting point: Casablanca
Leaders: M. Bouabdellah, J. Cauzid and A. Cheilletz - jean.cauzid@univ-lorraine.fr or mbouabdellah2002@yahoo.fr or alain.cheilletz@univ-lorraine.fr

• FIELD TRIP 3. **Rare metal granites and W deposits of the French Massif Central**
3 Days - Post-conference - Starting point: Limoges-France
Leaders: M. Cuney and Ch. Marignac - michel.cuney@univ-lorraine.fr

• FIELD TRIP 4. **Geology-Soil sciences-terroirs and Burgundy wines**
4 Days - Post-conference - Starting point: Dijon
Leader: B. Bois - benjamin.bois@u-bourgogne.fr

• FIELD TRIP 5. **Rare metal ore deposits of the Erzgebirge and their potential for future technologies**
5 Days - Post-conference - Starting point: Freiberg (Free State of Saxony) / Germany
Leader: Th. Seifert - thomas.seifert@mineral.tu.freiberg.de

• FIELD TRIP 6. **The Carpathians porphyry and epithermal deposits, Romania**
4 Days - Post-conference - Starting point: Cluj Napoca International Airport (Avram Iancu), Romania
Leaders: C. Tamas, L. Bailly, S. Udubasa and A.S. André-Mayer - calingtamas@yahoo.fr

• FIELD TRIP 7. **The epithermal and porphyry in the Caucasus (Georgia and Armenia)**
8 Days - Pre-conference - Starting point: To be confirmed
Leader: R. Moritz - robert.moritz@unige.ch

• FIELD TRIP 8. **Cu-Pb-Zn-Fe mineralizations, geology and archaeology of the Lavrion area, Greece**
3 Days - Post-conference - Starting point: Athens international airport
Leaders: A. Tarantola, O. Vanderhaeghe, D. Morin, Ch. Scheffer, A. Photiades, P. Voudouris - alexandre.tarantola@univ-lorraine.fr

• FIELD TRIP 9. **Central Pyrenees metallogenic belt: Salau (W-Au), Luzenac (Talc), MVT (Pb-Zn)**
2 Days - Post-conference - Starting point: Toulouse
Leaders: S. Salvi and D. Béziat - stefano.salvi@get.obs-mip.fr

• FIELD TRIP 10. **One day excursion around Nancy**
1 Day - Post-conference - Friday 28th August
10A. Ste Marie-aux-Mines (Co-Ni-Ag old mines)
maryse.ohnenstetter@univ-lorraine.fr
10B. Varangéville salt mine - Salins du midi
anne-sylvie.andre@univ-lorraine.fr
10C. ANDRA nuclear waste underground laboratory
jerome.sterpenich@univ-lorraine.fr

• FIELD TRIP 11. **W-Sn and Au deposits in NW Iberia, Spain and Portugal**
5 Days - Post-conference - Starting point: Porto
Leaders: F. Tornos, J. Relvas, A. Pinto - jrelvas@fc.ul.pt - ftornos@cab.inta-csic.es

• FIELD TRIP 12. **Polish Kupferschiefer**
3 or 4 days - Post-conference - Starting point: to be confirmed

STUDENTS

Students working on ore deposits and metal cycle are encouraged to submit abstracts and present their results at the 13th SGA Biennial Meeting in Nancy. The meeting will be a great opportunity for students to interact with leading scientists, other young researchers and industry representatives in an inspiring and informal environment.

Attractive benefits, such as grants and awards are offered to students to encourage their participation in SGA2015. The registration fee for all students is at a reduced level, with the lowest registration fee (200 €) offered to SGA student members.

• **Student grants**
To support the participation of students at the conference, a limited number of grants are available for SGA students who are senior authors of accepted abstracts. Priority will be given to students from economically disadvantaged countries.
Deadline for SGA grant application: 28th February 2015
Notification of student grants awards: 15th May 2015

• **Free excursions**
Several pre- and post-meeting excursions are being organized and limited number of free registrations (one per trip) will be offered to students.
Deadline for SGA free field trip application: 28th February 2015
Notification of student free field trip: 15th May 2015

• **Student Awards**
The best student oral and poster presentation will be awarded a certificate and a prize of 250 €.

• **Contacts**
Do not hesitate to contact the Student Committee members if you have any questions, comments or suggestions.

• **The SGA Student Committee**
Anna Vymazalová (anna.vymazalova@geolog.cz)
Jorge Relvas (jorge.relvas@fc.ul.pt)

• **Student SGA2015 Local Organizing Committee**
Francois Turlin (francois.turlin4@etu.univ-lorraine.fr)
Guillaume Barré (guillaume.barre1@etu.univ-lorraine.fr)

SGA STUDENT CHALLENGE!

NEW

New!! An exploration challenge for Student Chapters!

Defend your Student Chapter colours in the first-ever edition of the «SGA Student Chapter Exploration Challenge!»

In teams of three, students will battle it out in a 12-hour mining exploration project.
Each team will be assigned a sector to prospect. Using a computer with ArcGIS installed, and the available geological and geophysical data for the sector, teams will be required to:
- Target a mining property
- Develop a detailed mining exploration program for their chosen metal, selected on the basis of the geological context
- Produce a detailed report in the form of a presentation (max. 20 slides).

Join in or support your team on Wednesday 26th August, 8 am to 8 pm!

REGISTRATION

On-line registration will be open from 15th January 2015 until 31st May 2015 for early-bird registration.

REGISTRATION FEES	Before May 31 2015	After May 31 2015
SGA member	470 €	520 €
Non member	575 €	625 €
Student, SGA member	200 €	250 €
Student, non member	250 €	300 €
Accompanying person	50 €	75€

Fees for delegates and students include:
- Admission to all scientific and plenary sessions
- Morning and afternoon refreshments
- Ice-breaker party
- Cheese and wine party – Poster session 1
- Beer and "charcuterie" party – Poster session 2
- All meeting materials including the final program and conference abstract volume in digital format.

IMPORTANT DATES

15th January
Abstract submission open
On-line registration open

28th February 2015
Abstract submission
and on-line registration closed

1st April 2015
Final versions of revised abstracts due from authors

1st May
Notification of final acceptance or rejection of abstracts

31st May
Deadline for early-bird registration

1st July 2015
Detailed schedule
with presentations and posters

SPONSORSHIP AND EXHIBITION

Please contact
the Local Organizing Committee
for further discussion and
information regarding the
sponsorship opportunities:
sga2015-contact@univ-lorraine.fr