

# **Activities of SGA Student Chapters**

The main feature of SGA News 39 is a compilation of reports that highlight the activities of six SGA Student Chapters around the world: Morocco, Nancy, Prague, Colombia, Québec, and Baltic.

1. First Student Meeting and Field trips on Moroccan Mining Potential: News from SGA-Moroccan Student Chapter (Morocco) and Student Chapter of Prague (Czech Republic)

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The "First Student Meeting and Field trips on Moroccan Mining Potential" was the first official activity of the new SGA-chapter established in Morocco. This chapter is called "SGA-Moroccan Student Chapter". The first meeting took place in Marrakech from 13th to 21st March 2016.

Indeed, eight PhD students of the Cadi Ayyad University who are working on different ore deposits have initiated this meeting and invited few members of the Prague chapter to discover mineral deposits and geology of Morocco.

The Moroccan students organizing this event were:

- Zaineb Hajjar, president of the SGA-Moroccan Student Chapter, who is studying the mineralization related to the ultramafic rocks in the Rif domain (North Morocco).
- Said Ilmen, General Secretary of the chapter, who is working on skarn, carbonate-replacement deposits and auriferous shear zones in the western High Atlas.
- Bouchra Baidada, who is studying the Pb-Zn-Cu-Ag-Au-(Mo) mineralization related to Precambrian granitoids in the eastern part of the Saghro massif (Imiter area, Eastern Anti-Atlas).
- Ismaïla N'Diaye, web master of the chapter, who is working now on the

Kettara massive sulfide deposit (Central Jebilet, Morocco).

- El Arbaoui Amal, Treasurer of the chapter, who is working on polymetallic and precious mineralization of the Roc Blanc (Central Jebilet).
- Omar Guillou, web master of the Chapter, who is studying the petrographic and geochemical features of the Adrar Souttof massif (Moroccan Sahara, South Morocco).
- Mohamed Bhilisse, member of the chapter, who is studying the mineralization related to the ultramafic rocks at the Bou Azzer ophiolite (central Anti-Atlas).
- Abdessamad El Khalile, member of the chapter, who is studying the Mo-W-Cu mineralization related to the Azegour skarn Deposit (western High Atlas)

The Czech students were: Daniil Belokopytov, Dominik Brém, Jan Bubal, Jan Kulhánek, Irena Olšanská, Karolína Hladíková, Matěj Němec, Petra Venhauerová.

The Czech colleagues started the program on the 6th, March (2016) by driving to Mibladen, area with galena mines and world-famous large crystals of vanadinite.

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# **News of the Society**

#### SGA Ordinary Council Meeting, Lisbon, Portugal, April 7, 2016

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

Jorge Relvas (SGA President) welcomed Council Members and R. Foster (SEG President) on behalf of the SGA and Faculty of Science, University of Lisbon. J. Pašava (SGA Executive Secretary) thanked on behalf of SGA Council for organization of 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.

# SGA-SEG relationship including a joint policy on Latin American Metallogeny Course and an agreement on future SGA and SEG meetings

J. Relvas (SGA President) thanked R. Foster (SEG President) for participation in the SGA Council Meeting and highlighted a long-term successful collaboration with SEG. He informed on recently approved SGA activities, which include organization of a complimentary exhibit booth at the SEG Conference in Turkey (2016) with David Leach, a previous SGA President acting as the SGA Invited Speaker at this conference. Under the light of the reciprocity established between SGA and SEG, a similar scenario was offered to SEG for the SGA2017 Meeting in Quebec (complementary booth and SEG keynote speaker). For the future, in order to guarantee the opportunity to each Society to propose a larger involvement at each other's meeting; it has been proposed that each society may consider the participation of the other at an earlier stage of planning of the meetings. SGA would be willing to assume a greater contribution at the SEG meeting in China, in 2017, and, of course, it would consider a similar scenario for SEG at the SGA meeting in Quebec, in 2017, if this was the intention of SEG. R. Foster thanked for invitation to the SGA Council Meeting and greatly appreciated a good interaction between both societies. He informed that he will become the Chair of the SEG Meeting Committee in 2017 and that he will be ready to work with SGA Council on relevant SGA presence at the SEG2017 (China).

#### Reports of officers on Council

- 4.1. Report from President (presented by J. Relvas)
- 4.2. Report from Executive Secretary (presented by J. Pašava)
- 4.3. Report from Treasurer (presented by H. Frimmel)
- 4.4. Report from Promotion Manager (presented by P. Eilu)
- 4.5. Report from Chief Editor, SGA News (on behalf of M. Chiaradia presented by I. Pašava)
- 4.6. Report from Chief Editors, MD (presented by B. Lehmann and G. Beaudoin)
- 4.7. Report from Chief Editor SGA Special Publications (presented by J. Slack)
- 4.8. Report from the Chief Editor SGA website (presented by N. Koglin)
- 4.9. SGA Educational Fund (presented by K. Kelley)
- 4.10. to 4.16 Reports from Regional VPs (Asia on behalf of Huayong Chen presented by J. Pašava, Australia/Oceania on behalf of R. Skirrow presented by J. Pašava, Europe presented by S. Decree, South Africa on behalf of L. Greyling presented by H. Frimmel, North America on behalf of S. Piercey presented by G. Beaudoin)

Based on info from the SGA Treasurer, SGA Council noted that the Society for Geology Applied to Mineral Deposits does not have any interaction with "sensitive" countries that are subject to sanctions imposed by the international community.

After discussion, Council approved the presented reports with great thanks and the following motions:

P. Eilu to prepare a draft of guidelines for filling up SGA application forms and send it to J. Pašava for final administration (every new applicant must provide name/surname/postal and email address/mode of payment; applicants for renewal have to be informed about late fees).

P. Eilu to suggest promotional items to be purchased and paid by remaining budget from Springer for 2016.



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(the latter must be in grey level tones,
not colour!). Please always send a paper
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J. Slack to clarify SGA role in Springer Briefs on Mineral Deposits with A. Vizcaino and report to next Council meeting.

P. Eilu to continue looking after distribution of SGA promotional items upon request of SGA RVP's and possibly other Council members organizing SGA major and/or co-sponsored geoevents.

P. Eilu to send 50 copies of SGA EF flyers to K. Kelley for the purpose of letters requesting donations.

All Council members to help M. Chiaradia to identify suitable main article for the upcoming SGA News (deadline for submission of contributions is May 15, 2016).

All Council members to help B. Lehmann and G. Beaudoin to identify suitable theme and authors for "milestone papers" for MD. J. Slack to continue editorial efforts associated with 4 SGA Special Publications, which are at different stages of preparation and report to next Council Meeting (Isotopes in Mineral Exploration, A Hydrothermal History of the Yilgarn Craton and its Relevance to Gold Exploration, Agromining: Farming for Metals, and Supergene Mineral Deposits).

N. Koglin to continue with identification of most suitable abstract handling system (submission, reviewing, editing) to be applied for future SGA Biennial Meetings (R. Foster offered to provide details on SEG abstract handling system).

N. Koglin to continue sending of automatic reminders regarding membership renewal (for early fee: 30.9. – to start the new payment turn for the new year on 1.10/1.11/1.12/beginning of January – to remind of the approaching end of early fee; for general reminder: 1.4 and 6.6).

N. Koglin to address all Council members to encourage them to provide updated info to different sections of the Society website. K. Kelley to inform about every new donation to SGA EF and to provide logo and full name of donor to N. Koglin (to be displayed for 1–2 years at website) and M. Chiaradia (to be published in SGA News).

S. Decree to find out about possibility of publishing selected papers from scientific session on Phosphorite deposits (IGC Cape Town) as SGA Special Publication and report to next Council meeting.

S. Decree to prepare a draft of letter to EAG on possible collaboration and exchange of membership benefits. SGA would like to (i) avoid any clashes between SGA Biennial meetings and MD sessions at Goldschmidt conferences, (ii) suggest a role at putting together MD Program at future Goldschmidt conferences.

S. Piercey and G. Beaudoin to get in touch with A. Buettner to find out about possibility of sharing Springer booth at upcoming PDAC for SGA promotion.

#### Results of SGA 2015 ballot

The report was presented by J. Pašava and the results were displayed at SGA website and emailed to SGA Council members in late 2015.

#### Final report on SGA 2015

This item could not be covered due to absence of Anne Sylvie André-Mayer (unexpected health problems) and will be presented at the next Council meeting.

#### SGA 2017 – update

The report was prepared and presented by G. Beaudoin (Chair of the SGA 2017 LOC). After discussion Council approved the presented report with great thanks and the following recommendations:

– to offer a session on Nonmetallic mineral deposits

to offer a possibility of ordering printed version of Conference Proceedings

- to calculate with free booth for SGA, SEG, Springer and IAGOD
- to lower price of Gala dinner to a range 60-80 EUR
- to offer SEG more active role if SGA gets one in SEG2017 Conference
- to keep fieldtrip budget separate from the main Conference budget Council accepted to split a Conference profit 50:50 between LOC and SGA.

Actions: G. Beaudoin to prepare updated Conference flyer and work jointly with Council member and RVP's on promotion of the SGA 2017 Meeting.

#### Presentation of received bids and decision on the SGA 2019 Meeting

After introduction summarizing procedure of handling of bids and getting additional information from proponents (J. Pašava) the SGA President (J. Relvas) described the three received bids (Bologna, Italy; Glasgow, UK; and Rotorua, New Zealand). After intensive discussion, the majority of the Council (including votes of Council members present and received in proxy by S. Archibald, M. Bouabdellah, E. Campos, L. Greyling, D. Moncada, B. Orberger, A. Piestrzynski and S. Roberts) voted in favor of the Glasgow bid. Council also approved that no budget template will be provided to potential bidders for future SGA Biennial Meetings as every meeting has its specific character. Instead, the quality of a submitted budget can be used as one of potential indications on the suitability/capability of a given group to stage a successful SGA Biennial Meeting. Actions: J. Relvas to inform all proponents about Council decision and to provide chair of the LOC of the Glasgow bid with MOU to be signed between SGA and LOC.

# Progress report on membership drive from the last SGA Council Meeting

P. Eilu presented this report. The Society had at the end of 2015 1346 members, which is new end-of-year record, with 18% increase from 2014. During the past eight months, we received 211 new members: 20 regular and 191 student members. It is important to attract student members to become regular members and to make regular membership more attractive. After discussion Council approved the report with great thanks and the following motions:

N. Koglin jointly with H. Frimmel to prepare a list of SGA membership benefits and highlight them on the main page of the SGA website.

J. Relvas to address all RVPs with a request for their collaboration regarding non-renewing members.

# Status of development of SGA Student and Young Scientist network including student support at SGA 2015

The summary report was presented by A. Vymazalová and J. Relvas. Reports from individual Chapters were discussed and evaluated (Baltic, Barcelona, Colombia-Bogotá, Laval, Morocco, Nancy, Peru, Prague and Siberia). All reports were approved by Council with great thanks. Council approved budgets for 2016 as follows: Baltic – 4500 EUR, Barcelona – 2000 EUR, Bogotá – 500 EUR, Bucaramanga – 2000 EUR, Laval – 1000 EUR, Nancy – 0 (a subject of a new application after spending the 2015 budget), Morocco – 1000 EUR, Peru – 1000 EUR, Prague – 4000 EUR, and Siberia – 2500 EUR.

Actions: A. Vymazalová to inform representatives of individual Chapters about Council decision on 2016 Chapter budgets.

A.Vymazalová to prepare a draft of guidelines on how financial contributions from SGA to Chapters can be used.



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#### Requests for sponsorship

A request for sponsorship (EUR 500) of students (have to become SGA member) to the meeting on Modern IT in Earth Sciences (August 7–11, 2016 Yuzhno-Sakhalinsk Russia) was presented by E. Naumov and approved by Council.

Action: E. Naumov to inform Conference organizers on approval of their request.

P. Eilu to send ppt presentation of SGA to E. Naumov to be translated into Russian and presented at selected geoevents in Russia.

#### Any other business

• SGA Award Committee - update

K. Kelley presented this report. Council greatly appreciated efficient work by the Award Committee under leadership of D. Huston and approved new members of the Award Committee (S. Piercey – Chair, D. Huston, Huayong Chen, Iain Pitcairn and T. Monecke - members). Council also approved that call for nominations for SGA-KGHM Krol Medal will follow similar scenario as for the SGA-Newmont Gold Medal and SGA Young Scientist Award.

Action: S. Piercey to prepare a general call for nomination for upcoming SGA News and website.

• Constitutional/By-laws changes

This issue was additionally raised by SGA President on recommendation of Executive Secretary. Council approved an ad hoc team (J. Relvas, K. Kelley and J. Pašava) who will prepare a draft of suggested changes. The plan is to email a draft of Con-

stitutional changes to Council members, discuss them at SGA Council Meeting in November 2016 and have the final version of the Constitutional changes approved at 2017 Spring Council Meeting so that it can be sent to ballot to SGA membership and results announced at SGA GA in Quebec City. A similar scenario is suggested for changes of By-laws, which are intended to be approved in Spring 2017 Council meeting (these don't need to go for SGA membership ballot).

• Future of SGA Conference Books

This issue was presented by G. Beaudoin. After discussion Council concluded that the present format of papers (up to 4 pages), scientific quality, keeping 1 abstract per 1 first author and keeping SGA Books of Proceedings listed in ISI Thomson Reuters should be our long-term priority.

- · New Contract with Springer
  - J. Relvas informed Council that the negotiations between SGA and Springer to reach and sign a new MD contract (2017–2026), have already started; the SGA's task force for this negotiations is composed of six persons: a "first line" represented by the Treasurer and the two MD editors, and a "second line" represented by the President, Vice-President and Executive Secretary. The plan is to have the final document formally signed at November's Council meeting to which Annette Buettner (Springer) will be invited.
- MAC-SGA Contract on Uranium volume Information was given by G. Beaudoin. Council highly appreciated this collaborative project.



SGA Ordinary Council Meeting held on April 7, 2016 in Lisbon, Portugal. From far left: J. Slack (Editor, SGA Special Publications), A. Vymazalová (SGA Vice President for Student Affairs), R. Foster (SEG President), J. Kolb, H. Frimmel (SGA Treasurer), B. Lehmann (Chief Editor, MD), G. Beaudoin (Chief, Editor, MD), P. Ledru, S. Decree (RVP Europe), J. Pašava (Executive Secretary), J. Relvas (SGA President), K. Kelley (SGA Vice-President), D. Banks, E. Naumov and N. Koglin (Chief Editor, SGA website). Photo by P. Eilu.

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- Short Course on African Metallogeny

   Gabon
- The report on the development of this course was prepared by B. Orberger and given by J. Pašava and H. Frimmel. The course had to be unfortunately cancelled and promised for 2018. The 2017 course is under negotiation.
- B. Orberger to continue preparation of the 2017 Short Course on African Metallogeny and provide update at the next Council meeting.
- SGA at the 35th IGC (H. Frimmel, P. Eilu)

Update on SGA-IGC related activities was provided by H. Frimmel (on a joint SEG-SGA session on Gold), P. Eilu (on SGA promotion) and J. Pašava (on representation of SGA in a joint IUGS-IGC meeting). It was agreed that SGA will hold an "intermediate" Council meeting in Cape Town as it turned out that there will be sufficient number of Council members present. The precise venue and timing will be provided to Council members in due course.

Action: H. Frimmel and J. Pašava to prepare a Council Meeting in Cape Town.

# Date and Place of the Next Council Meeting

IGC (Cape Town – August 2016 – a precise date and venue will be announced in due time) and November 7, 2016 – Brussels/Belgium (will be hosted by S. Decree – RVP Europe).

#### Informative list of past activities

- Goldschmidt 2015, Prague, Czech Republic, August 16–21, 2015 6 SGA sponsored sessions approved EUR 3000 for student support approved by Council (spent only EUR 2500 5 grants / 500 EUR each)
- SGA Seminar on Northern Fennoscandian Ore Deposits and 3/4D Modeling, Lulea Sweden, September 7–8, 2015 – SGA sponsorship of EUR 800 approved for keynote speaker
- SEG 2015 Conference, Hobart, Australia, September 27–30, 2015 SGA booth, plenary speaker, SGA session R. Skirrow

#### Informative list of future activities

- XXXIV UNESCO-SEG-SGA Curso Latinoamericano de Metalogenia "El sistema Pórfiro (Incluyendo Yacimientos Epitermales) – Yacimientos tipo IOCG – Geología y Metalogenia Andes Centrales" (Copiapó, Chile, 20–30 April 2016) – F. Tornos (SGA link) – a longterm support of USD 2500 approved via a joint SEG-SGA agreement
- GAC-MAC (1-3 June 2016, Whitehorse, Yukon). SGA representative: Steve Piercey, who will coordinate a SGA booth with Annett Buettner (Springer)
- Ressources Minérales: Du Terrain à l'Expérimentations", (June 7-9, Toulouse, France) – EUR 1,000 approved for support of 3 SGA speakers and free registration of all SGA student members
- 7th International Geochemistry Symposium (16–18 May 2016, Antalya Side, Turkey) D. Banks-SGA

- The 8th International Siberian Early Career Geoscientists Conference (June 13-24, 2016 Novosibirsk, Russia).
   SGA link – E. Naumov (request for sponsorship to SGA student members and keynote speakers in preparation)
- Gordon Research Conference (June 19–24, 2016 Switzerland)
- Meeting on Modern IT in Earth Sciences (August 7-11, 2016 Yuzhno-Sakhalinsk Russia) – EUR 500 approved for SGA student member support
- 35th IGC (August 27-September 4, 2016 Cape Town, South Africa) – SGA/ SEG session on gold deposits; participation of SGA/ES in IUGS-IGC Council Meeting on behalf of SGA
- 13th International Nickel Symposium (5-9 Sept 2016, Perth-Fremantle). SGA representatives: Wolf Maier – EUR 1000 approved for SGA student members support (info S Barnes)
- 2nd European Mineralogical Conference (September 11-15, 2016 Rimini, Italy) sponsorship of five sessions in the Theme 9 Mineral deposits and raw materials 8 grants of 250 eur or 10 grants of 200 eur for SGA student members (total sum up to EUR 2,000)
- SEG 2016 Conference (September 25-28, 2016 Turkey) - D. Leach SGA Speaker + free booth (P. Eilu organizing manning the booth)
- 15th IAGOD Symposium (August 28-31, 2018 Salta, Argentina) – invitation from IAGOD to suggest a mode of SGA presence

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

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#### LIST OF NEW SGA MEMBERS (November 1, 2015 – March 31, 2016)

11 Regular and 137 Student Members applied for membership during this period

#### REGULAR MEMBERS

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Miss Šárka Matoušková Prague CZECH REPUBLIC

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# Message from the President

#### Jorge Relvas

University of Lisbon, Portugal; e-mail: jrelvas@fc.ul.pt



It is consensual that the last years have been a hard time for the global economy and, in particular, for the European economies. For a number of reasons that go from globalization to the blind belief in the self-regulatory capacity of markets, large cracks threatening the stability of the world economy have appeared on two main aspects: the global financial crisis and the sharp instability of primary commodity prices. As in many other domains, this situation heavily and directly affected the mining industry and the whole sector of raw materials.

Reserves of key mineral resources are diminishing, while exploration and material extraction costs are rising. Massive wastes, coupled with growing tensions around geopolitics and supply risk, are contributing to volatile commodity prices. The sustainable sourcing of raw materials requires crucial changes and new paradigms at the beginning of a new economic cycle. It is time for change. A circular economy could help stabilise some of these issues by decoupling economic growth from resource consumption. Recycling, repair, reuse and remanufacture offers an important but limited solution as these processes are often energy-intensive and commonly downgrade materials, leading to continuing high demand for primary resources.

Making the transition to a new and more sustainable economic cycle will be complex. It will require new skills within the STEM (Science, Technology, Engineering, Maths) subjects, but also across increasingly important fields of knowledge, such as design and digital modelling. There is an urgent need of policies and strategies that drive a sustainable management and responsible consumption of natural resources and products worldwide. In this context, educational outreach work with universities and secondary schools is a fundamental step that needs to be fostered.

Over the last fifty years, SGA has always known how to evolve with the real world, adjusting its strategies and practices to the needs of each moment. This is again our challenge. Despite all the difficulties, SGA never stopped growing and, thanks to the volunteering work of many dedicated scientists and professionals working on economic geology and environmental

aspects related to mineral deposits across the world, SGA became a leading international scientific society. Today, SGA is a strong, healthy and renowned organization, with a highly ranked scientific journal, a large, truly global and actively involved membership, and a vibrant network of student chapters. The Society organizes prestigious regional metallogeny short courses in Latin America and Africa, and highly attended Biennial Meetings, whose scientific quality is truly outstanding and makes them our proud flagship conferences. The Society is also widely recognized for its pioneering role in supporting educational activities for students and professionals from economically disadvantaged backgrounds through the SGA Educational Fund. By sponsoring student activities and regional meetings, workshops and short courses in areas of the world, such as Asia, South America, Africa and the Middle East, with partner organizations such as the SEG, IAGOD, IUGS and UNESCO, the SGA membership and our visibility keeps growing across the world.

As incoming president of SGA, I would like to acknowledge the past Council and, in particular, our past President, Georges Beaudoin, for their exceptional work in contributing to make SGA what it is today. I would also like to welcome the new members of the SGA Council and thank their volunteer collaboration. For sure, the standards were left very high for any successor who wants to follow this fantastic path. I look forward to working with you on this demanding goal.



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#### >>> page 1 Activities of SGA Student Chapters

The shafts are located about ten kilometers west from Midelt city and are still exploited by several miners. They were guided throught the old stole and allowed to collect some samples of pure red vanadinite with size up to 8 mm. In the evening they entered theold mine with galena and barite in carbonates with secondary minerals like deep-orange wulfenite and glossy cerussite. Another day, they had the chance to see also large layers of selenites, which are mined for decorative purposes. Then they crossed the High Atlas and continued to the south. This area belongs geographically to the Anti-Atlas and is almost totally desert. The best known sand dunes of Morocco - Erg Chebbi (Merzouga) - are located here as well as dozens of localities where trilobites and crinoides are found, and also the mineralogical locality Taouz, known for its Pb-veins. Here they have also seen some nice secondary minerals, like cherry vanadinites or mimetites. Another stop was in Imilchil, the highly situated locality known for its apatite-, magnetite- and titanite-bearing pegmatites. The last stop of the Czech colleagues was the Imini mine, where they observed sedimentary manganites (Mn) of Cretaceous age, with layers of pyrolusite, before meeting the Moroccan colleagues at the Agdz village on March 13th, 2016.

The aims of the first Meeting were to give another view of the Geology of Morocco for PhD Students and undergraduate students and exchange ideas and comments between graduate and undergraduate students, and finally to present these ideas with our Prague guests. It

included field trips to different geological domains and mineral deposits.

The meeting lasted over nine days, during which members from both the SGA-Moroccan Student Chapter and the SGA Student Chapter Prague, visited different types of ore deposits such as those related to ultramafic rocks, skarn, VHMS, and epithermal mineralization. Furthermore a phosphate deposit was also visited.

#### The Meeting program included:

From March 6th to 12th: Arrival of the Czech colleagues. They started their program to visit many ore deposits and many tourist places.

March 13th: Road to Agdz to meet the Czech Colleagues.

March 14th and 15th: Road to Bou Azzer (Ouarazate) and visit of Bou Azzer underground (Co-Ni mineralization).

March 16th: Visit of Draa Sfar underground Mine, Marrakech.

March 17th: Excursion in Central Jebilet Variscan belt, where we visited massive sulfide mineralization (Kettara pyrrhotite deposit; Koudiat Aicha massive sulfide deposit).

March 18th: Jebilet massif with other type of mineralization (Bir N'Has Pb-Zn deposit and Frag El Ma graphite skarn deposit).

March 19th: Seminar at the Faculty of Sciences-Semlalia, Marrakech.

The seminar included three conferences:

- Geology of Morocco, animated by Pr. Omar Saddiqi from Hassan II University.
- Moroccan mining potential, animated by Mr. Mustapha Chaib from ONHYM.
- Geology of Czech Republic.
- March 20th: Visit of the Azegour skarn deposit (Western High Atlas).

March 21th Visit of the Youssoufia phosphate deposit.

The first Field Trip, form March 13 to 15th, was led by Mohamed Bhilisse and Bouchra Baidada: we visited Bou Azzer ophiolite and related mineralization. The first cross section was done along the ophiolitic sequence, where we have seen some minor mineralization hosted in serpentinites. In a second time, we visited some Co-Ni deposits in Aghbar, and the underground Bou Azzer mine.

The second Field Trip on the Jebilet massif was divided into three stops along three days (from March 16 to 18th). These stops were illustrated by Amal El Arbaoui and Ismaila N'Diaye.

Stop 1: Draa Sfar polymetallic deposit. This deposit is owned by the MANAGEM group and is located 30 km NW of the Marrakech city. The mineralization is hosted by Visean Sghlef schists in the Jebilet massif. During this field trip the students have received many explications about the geological context of the mineralization, mineral distribution, and the mode of exploitation. Then the students visited the underground mine of Draa Sfar north (-75m).

The polymetallic Draa Sfar (DS) mine is a Volcanogenic Massive Sulphide (VMS) type deposit, hosted in the volcano-sedimentary upper Visean-Namurian Sarhlef series. It is composed of pyrrhotite, sphalerite, galena, arsenopyrite and chalcopyrite.

Stop 2: Kettara massive sulfide deposit. This field trip was led by Ismaila N'Diaye. The Kettara deposit is an old mine located in the Jebilet massif and exploited for pyrrhotite (sulfur acid). The mineralized Kettara bodies are hosted by weakly metamorphosed sediments (Sarhlef schists), which are intruded by bimodal intrusions (felsic and mafic plutons). The Kettara mineralization is considered as a Cu-pyrrhotiterich massive sulfide deposit.

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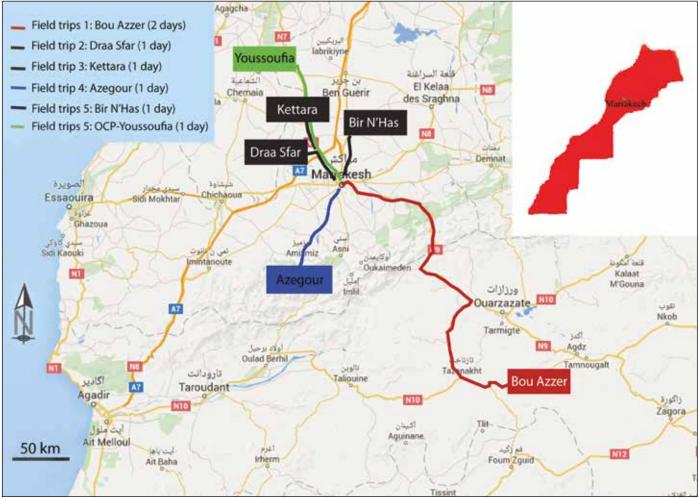
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Road map of Morocco showing the itinerary of the excursion and locations of visited mines.

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Stop 3: Bir N'Has and Frag El Maa Deposits. Pb, Zn, Ag veins mineralization such as Bir N'Has deposit, and a skarn mineralization in Frag El Maa deposit. We visited the N45 to N60 mineralized veins in Bir N'Has, composed by galena, sphalerite and chalcopyrite, associated with quartz crystals, calcite and ankerite. Quartz with other minerals have crystallized in forms of concentric, geodic and comb textures. Those mineralized veins are hosted in Sarhlef shale. In the Frag El Maa deposit, we sampled ores (graphite, idocrase, and garnet) related to skarn mineralization.

A meeting was organized on March 19th to promote and valorize the Moroccan geology and its mining potential, and exchange ideas with our guests from the SGA student Chapter Prague.

The opening ceremony was initiated by Pr. Mly Hassan Hbid (Dean of Faculty of Sciences-Semlalia, Mly Ahmed Boumehdi, Assistant Chief of Geology Department and Pr. Abdelkhalek Alansari (Head of Dynamics of Lithosphere and Genesis of Mineral and Energetic Resources Laboratory) who welcomed the Prague students and the invited professors, and expressed their wishes for the success of the new SGA chapter established in Morocco.

# The Meeting program included also three Conferences:

 The First Conference was presented by Pr. Omar Saddiqi (Professor of Geology and Dean of Faculty of Sciences-Ain Chock, Hassan II University, Casablanca). The conference was entitled "GEOLOGY OF MOROCCO: AN OVERVIEW", and presented the geology

- of Morocco from the south to the North.
- The second conference, entitled "The Moroccan mining potential and the role of ONHYM in the development of the mining sector in Morocco", was presented by Mr. Mustapha Chaib (Geologist Engineer from ONHYM, Rabat). Mr. Chaib presented the Moroccan mining potential and the exploration techniques and strategies used by one of the famous mining operators from Morocco.
- The third conference dealt with the "Geology of the Bohemian Massif Mining potential in Czech Republic", and is presented by Jan Bubal (Msc student of the SGA student Chapter Prague).

Third Field Trip (March 20th): The group of participants visited the Azegour Mo-W-Cu skarn deposit, which is located



Photo of members of SGA Student Chapter Prague (Dominik Brém, Jan Bubal, Jan Kulhánek, Irena Olšanská "Matěj Němec) and Ismaila N'diaye (from SGA Moroccan Student chapter with geologist from Bou Azzer mine.



Picture of particpants from SGA Moroccan Student Chapter (Bouchra Baidada, Ismaila N'Diaye, Mohamed Bhilisse, Amal ElArbaoui and Zaineb Hajjar) and members from SGA Student Chapter Prague (Matěj Němec, Jan Kulhánek, Jan Bubal, Dominik Brém, Irena Olšanská) with geologists from Agbar mine. (Bou Azzer inlier)



Photo of members of SGA Student Chapter Prague (Dominik Brém Jan Bubal, Jan Kulhánek, Irena Olšanská, Matěj Němec) and Ismaila N'diaye (from SGA Moroccan Student Chapter with geologist from Bou Azzer mine).



Picture of members from both SGA Moroccan Student Chapter and SGA Student Chapter Prague visiting and studying ores in the Bir N'Has deposit.

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on the western High Atlas mountains. This field trip was led by Said Ilmen and Khalil Abdessamad (PhD students). The abandoned mine of Azegour is developed in the metamorphic aureole of a Permian granite. The Mo-W-Cu skarn type mineralization

occurs as irregularly shaped clusters, pods or thin lenticular bands following compositional banding. Ore minerals consist mainly of molybdenite, chalcopyrite and scheelite, with minor amounts of galena, sphalerite and pyrite. Fourth Field Trip (March 21th): visit to the Youssoufia Phosphates complex (Gantour site). This visit was led by. Youssef Daafi (PhD student and Manager Geologist from OCP). This field trip started with a presentation on the OCP



Opening Ceremony photo: From the left, Pr. A. Alansari, Pr. Mly H. Hbid, Pr. Mly A. Boumehdi and Jan Bubal.



Pr. Omar Saddiqi.



From the left, Mr. Chaib Mustapha and Pr. Abdelkhalek Alansari.



Participants at the Gantour phosphate deposit.



Participants at the core drilling house (Draa Sfar mine).



Drill cores from Draa Sfar VMS deposit.

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activities given by Youssef Daafi. Youssef presented a summary on phosphates and the exploration techniques used by the OCP Group. Afterwards the participants visited the Gantour site where extraction of phosphates is active. It is important to highlight that Morocco contains 75% of the known reserves of phosphates on the planet. It is the largest exporter and the third largest producer of raw phosphates worldwide. Phosphates exploitation is a state monopoly represented by the Office Cherifien des Phosphates (OCP S.A.) created in 1920.

#### Acknowledgments:

On behalf of the SGA-Moroccan Student Chapter, we would like to address our acknowledgments to: Dr. Mly Hassan Hbid (Dean of Faculty of Sciences-Semlalia), Dr. Mly Ahmed Boumehdi (Adjoin Chief of Geology Department), Dr. Abdelkhalek Alansari (Chief of the DLGR Laboratory), Dr. Lhou Maacha (Managem Group), Dr Mohamed Zouhair (Managem Group), Dr. Omar Saddiqi (Dean of Faculty of Sciences-Ain Chock, Casablanca), Mr. Youssef DAAFI (OCP Group), Dr. Abdellah Mouttaqi (ONHYM), Mr. Mustapha Chaib (ONHYM), Anna Vymazalova (SGA), Mrs Houria Zryra (FSSM) and we present also our acknowledgments to Managem and OCP staffs who allowed our visits to mines and underground mines.

Faculty of Sciences-Semlalia, Managem Group, OCP Group, and SGA are warmly thanked for the financial and technical supports.



Gossan from the Kettara deposit.



Participants on the marble limestones (Azegour area, 1800 m altitude).



Mammellonar hematite from the Azegour skarn deposit.



Molybdenite from the Azegour skarn deposit.

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#### 2. News from the Nancy SGA Student Chapter

#### François Turlin

Université de Lorraine-Laboratoire GeoRessources, UMR 7359, Faculté des Sciences et Technologies, BP 70239, 54506 Vandoeuvre-lès-Nancy, France

1. Exploration Challenge in Québec Mines (Canada, November 2015)

Three student members of the SGA Student Chapter of Nancy were present at the Québec Mines 2015 conferences (from 23th to 27th of November 2015): Marion GROSJEAN, Julien BOULLIUNG and Valentin KREMER. Assisted by another student member (François TURLIN), they represented the University of Lorraine as a team for the exploration challenge that takes place every year during this congress. The other teams that participated are all from Qubec universities: Laval (Québec), UQAM (Montréal) and UQAC (Chicoutimi) universities. This challenge is a 12 hours rush during which each team has to work on the same geological region and has to propose an exploration campaign according to the data available (geochemistry, geochronology, stream sediments, structural, cartography, geophysics...). Their presence was a way to show that the University of Lorraine proposes formation in economic geology and that SGA is present in France and supports students. This event was fully financed by University of Lorraine (France) and LabEx Ressources 21.

2. Financial support of a student to attend the PDAC (Toronto, March 2016)

From March 6th to March 9th 2016 the SGA Student Chapter supported partially the participation of a student member (Solène MIERAL, ENSG-MsC) to the PDAC 2016 in Toronto. It is the third year that the SGA

Student Chapter of Nancy financially supports the attending of last year students to this congress. It gives the opportunity to a student to develop its social network with industrial actors in a mining country. Solène MIERAL was also available for presenting the University of Lorraine's formations at the university's booth. This financial support of about 120€ was complemented by the University of Lorraine and the LabEx Ressources 21.

3. Public movie projection: "Mines in Quebec: insight of the mining industry of the 21st century"

A movie projection about the mining industry of the 21st century in Quebec was organized on the 23rd November 2015 at the ENSG (University of Lorraine, France). The movie was followed by a public debate animated by Pr. Alain Cheilletz, Emeritus professor in metallogeny from ENSG (Université de Lorraine, France), who knows very well the mining sector in Quebec and is moreover the initiator of the annual Abitibi field school, co-organized with the Université du Québec en Abitibi-Témiscamingue (UQAT, Quebec) and the Ministry of Energy and natural Resources of Quebec (MERN Quebec). The public was composed both by MSc students in mineral exploration and mining engineering, and also by professors and researchers in economic geology and geomechanics. After presenting the economic importance of the mining industry in Quebec nowadays, the movie showed the

life-cycle of modern mines and the different successive operations (exploration, development, mining, processing, post-mining) in which the geologist is involved. The movie presented also the environmental and societal implications of the mining industry in Quebec through an historical point of view in the Abitibi region. This event was the opportunity to talk about the role played by the mining industry in the 21st century between the young point of view of students and the experimented view of senior scientists. Several topics were discussed during the debate following the movie, such as the life-style of a geologist in a modern mine (safety conditions, life in a remote camp, hard climatic conditions), the economic dependence of the mining industry to the variable metal prices cycles, or the societal and environmental responsibilities of mining companies regarding autochthonous populations and the protection of the environment. The movie and the debate have been greatly appreciated and the evening has ended with a social aperitif financed by the Student Chapter.

4. News from the trip to Finland involving 14 students of the ENSG – Nancy, from the 5th to the 11th of March, 2016 (By Gabriel CRUMIÈRE and Yann FOUCAUD, MSc students at the ENSG, University of Lorraine, France).

#### Introduction

In order to celebrate their graduation, a group of fourteen student SGA members





Figure 1: Left picture from left to right: Julien BOULLIUNG, Valentin KREMER and Marion GROSJEAN during their participation to the exploration challenge in Québec Mines 2015

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Figure 2: Presentation poster of the event.

from the Ecole Nationale Supérieure de Géologie (ENSG) in Nancy, France, realized a field trip in Finland. The ENSG is a French leading engineering school in applied geology and is part of the University of Lorraine, France. The fourteen involved students are members of the "Mining and Mineral Engineering" Master of the ENSG, which aims to form engineers specialized in the management of mineral resources, from exploration and mining, through mineral processing and extractive metallurgy, to post-mining recovery and monitoring. This trip has been supervised by Pr. Lev Filippov from the University of Lorraine and was organized by Géol'Explo Mines, a student association composed of four students: Baptiste VARIOT (President), Gabriel CRUMIÈRE (Vice-president), Yann FOUCAUD (Treasurer) and Alice RENAULT (Secretary). Hélène APAZA-BLANCO and Gaëlle MASSARD were active members, and all the other participants were members of the association. The aim of this trip was evidently to discover another country and a different culture, but also to visit industrial plants and mines in a mining country. This journey took place from the 5th to 11th of March 2016.

The trip in Finland was mainly financed by Eramet, but also by the ADINPL association, the SGA Student Chapter of Nancy and the ANDRA. It would not have been possible to realize this journey without the help of all the sponsors mentioned before, that we would like to thank warmly. Moreover, social events were organized by the association during the year in order to collect funding for the trip. The total

expenditure of the trip was 8,442 €, which have been entirely covered by the sum of the incomes.

The fourteen students left Paris on Saturday March 5th by plane, and landed in Helsinki in the evening of the same day. Twenty-four hours were left free for all, in order to visit the Finnish capital. A bus permitted then to go to Pori on Sunday March 6th evening. Two visits were programmed in Pori: visit of the Boliden pyro-metallurgical plant in Harjavalta on Monday, and visit of the Outotec research center in Pori on Tuesday. Then, the students went to Rovaniemi by an over-night train, where two more visits were established: visit of Agnico Eagle gold mine in Kittilä, on Wednesday, and visit of First Quantum Minerals copper-nickel mine in Kevista on Thursday. They returned to Helsinki on Friday March 10th and to Paris on the same day.

#### **Summaries of the visits**

The first industrial site was in Harjavalta, in the south-west of Finland, located 30 km from Pori. In Harjavalta, Boliden Company processes copper ores mainly from Sweden, Finland (and other countries) and produces copper anodes. During the visit, the students saw the process plant to obtain pure copper, and finally the anode casting. It was not possible to see the smelter. One of the most interesting thing about this plant site is that several companies cohabit in the same place: Boliden deals with copper ore, while Norilsk Nickel recovers the nickel, and other companies produce sulfuric acid from the SO<sub>2</sub> gas. At the exit

of the Harjavalta plant, copper anodes are made by 98.5 % copper, and are sent to copper refinery (in Pori), where 99.998 % purity copper cathodes are produced and sold. In 2015, Boliden produced 331 906 metric tons of copper, including 84 917 metric tons from their own ores.

On Tuesday March 8th, the students came to the Outotec research center, next to Pori. This company, formerly part of Outokumpu group, supplies technologies and services to many mining companies, especially in Finland and Sweden. The equipment composing the plants ranges from primary mills to final smelting, including all the physical treatment (such as flotation cells, magnetic separators...), and is mainly made by Outotec. We visited the research laboratories and we saw all the analytical facilities (optical microscopes, scanning electronic microscopes, X-ray fluorescence spectrometers, X-ray diffraction spectrometer...) used for the characterization of geological samples. Students could also see laboratory-scale flotation experiments, electromagnetic separation, leaching and even smelting. Outotec presented, during the second part of the visit, some of the scientific research they lead on current issues such as flotation with seawater, preg-robbing problems in leaching, a new software under development for scaling and material balancing, for instance.

On Wednesday March 9th, the students arrived to Rovaniemi. Here, they rent mini-buses to visit Lapland and to drive to the Kittilä gold mine, which is located about 200 km to the north of Rovaniemi



Figure 3: The Géol'Explo Mines team in front of the Kevitsa Cu-Ni sulphide mine open pit. From top left to bottom right: L. Pizzella, A. Renault, G. Massard, H. Apaza-Blanco, L. Filippov, Y. Foucaud, G. Gierczak, V. Kremer, V. Glazin, G. Crumière, B. Variot, E. Viry, V. Pouradier, M. Grosjean, and M. Boulanger.

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Figure 4: The group in front of the anode casting, at Boliden site (Harjavalta).





Figure 5: Left: visit of Lapland by mini-buses, driving to Kittilä mine. Right: presentation of drilling core at Agnico Eagle gold mine (Kittilä).

(the polar circle passes just close to this city). In Kittilä mine, which is the biggest gold mine in Europe, the Canadian group Agnico Eagle presented the geology of the area, which is a gold-bearing shear zone hosted in a greenstone belt, all the mining techniques used in the underground mine and the mineral processing flowsheet. The ore consists of gold-bearing sulphides, and the successive steps of the mineral processing are adapted to the mineralogy of the ore. Students had the possibility to see a part of the drill core performed on the site for the mining exploration, and then to visit the plant.

On Thursday March 10th was organized the visit of the copper-nickel Kevitsa Mine, currently mined by the Canadian company First Quantum Mineral. The deposit is a massive sulphides lens, containing highgrade Cu-Ni ore, mainly composed of chalcopyrite and pentlandite. PGM are present as inclusions in other minerals (especially in sulphides and arsenates). The mine was sold to the Boliden group just the day of the visit, for 650 M€. Kevitsa is a

very young mine, in which the exploitation started in 2013 as an open pit. This mine is remarkable because it is the biggest Cu-Ni sulphide mine in Europe. All operations from mining to processing are led with enormous and impressive devices. Kevitsa Mine owns some of the most gigantic trucks and excavators in the world, like the

Komatsu PC8000 for the hydraulic shovel or the Caterpillar 795F for the dumper. The latter can carry more than 310 metric tons of rocks from the pit to the crusher plant. The processing plant is divided into many buildings, among which some are huge, as the flotation building, which contains the biggest flotation cell in the world, with a 500 m<sup>3</sup> capacity (designed by Outotec). Totally, 36 million metric tons of rocks are mined each year, and 6.3 million metric tons of ore are treated through the plant. Recoveries of copper and nickel are respectively 87-90 % and 63-67 %. A relatively important amount of nickel is lost in fine particles of silicates, but also in pyrrhotite.

This field trip was the opportunity for most of us to visit a northern country (and, for one of us, to fly for the first time!). Every aspects of our formation were developed during the visits, thanks to the various activities and presentations proposed. Industrial sites that we visited are impressive, very clean and immense. No matter the site, we had a spectacular reception and we could see the core of the plants. It was a mind-blowing experience: all of us could apply concrete knowledge that we acquired before, theoretically. We would like to thank a lot all the companies that hosted us, for the quality of their presentation, their visit, and for their very good welcome. This trip was possible thanks to our sponsors Eramet, the ADINPL association, the ANDRA, and of course the SGA Student Chapter of Nancy. Thanks to all of them our group discovered a new country and his culture: students will certainly remember that Finland is a huge and welcoming country, and an example for the mining industry for cleanliness and efficiency.



Figure 6: First Quantum Mineral/Boliden Kevitsa, gigantic Caterpillar 795F carrying 350 tons of rock, followed by a pick-up (for the scale).

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# 3. Mineral deposits of the Upper Silesia – Mississippi Valley type and the Kupferschiefer type deposits (SGA Student Chapter Prague)

#### Ondřej Krátký, Marek Tuhý

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

The traditional October field-trip of the SGA Student Chapter Prague was this year dedicated to mineral deposits of Poland. Main attractions of this four-day field trip were underground visits to two active mines, Pomorzany mine (Pb-Zn, Mississippi valley type deposit) and Polkowice-Sieroszowice mine (Cu, Kupferschiefer type deposit) run by the KGHM Company. We have also visited the famous salt mine Wieliczka and the historical city Krakow.

We have started our field-trip by visiting the tourist mine Kletno located in the Snieznik Massif, Poland. This former uranium mine is famous for its colorful adits. Its walls consist mostly of colorful fluorite and quartz. The beginning of the mining activities in the Snieznik Massif can be traced back to 14th century. Mining operations have been conducted periodically for iron, silver, fluorite, copper and in the 20th century for uranium mainly. Then we have moved to the wonderful historical city of Krakow. On the next day, we have visited the world-famous salt mine of Wieliczka with its gigantic halls carved in solid salt. On the evening, students from the SGA Baltic Student Chapter prepared lectures about the main mineral deposits of Poland which provided an interesting learning opportunity.

The third day of our excursion was dedicated to Pb-Zn Mississippi Valley type deposits. They are located within dolomites of Devonian and Triassic age. Rarely, when dolomites are absent, mineraliza-

tion is developed in limestones. Typical ore minerals are sphalerite, galena, pyrite and marcasite. We have visited two localities, the active underground mine of Pomorzany, located within the Olkusz area, and dumps of the Bytom area. the Pomorzany deposit occupies an area of 12 km<sup>2</sup> and a mineralization is present in the form of layers

which are up to 1000 m long and several meters thick. Mineralized layers are composed of semi-massive sphalerite which firstly filled pore spaces and then replaced the majority of the carbonate massively. Galena does not occur together with sphalerite in mineralized layers, it can be found in brecciated ore only. Having the chance to see MVT ore underground, technology of mining in carbonate rock affected by hydrothermal processes and many other things was remarkably interesting. MVT deposits from the Bytom area are slightly different: galena here is the most silver rich in the Upper Silesia District and thus this area was mined for silver since the 12th century. Most intense exploitation took place in the 19th and 20th centuries.



Fig. 1. Quartz with fluorite wall at the Kletno mine.

Our last day was dedicated to the Polkowice-Sieroszowice mine, owned by the KGHM Company. It produces copper, silver, gold, Pt-Pd sludge, raw lead, sulfuric acid, Cu-sulfate, Ni-sulfate, technical selenium, rhenium and rock salt. The Lubin - Sieroszowice copper district is located in the south-west part of the Fore-Sudetic Monocline. This monocline is composed of Upper Permian to Cretaceous sediments. The deposit itself is formed by three different lithological units - Zechstein Limestone (lowermost part), the Kupferschiefer bed and the uppermost Weissliegende Sandstone. The copper-rich horizon is mainly restricted to the Kupferschiefer bed. Explotation of Cu-ores at the Polkowice mine begun in 1968 and recently it formed joint unit with



Fig. 2. Spectacular chamber at the Wieliczka salt mine.



Fig. 3. Underground of the Pomorzany mine (MVT deposit).

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the youngest Sieroszowice mine. The mine is located in the eastern part of the copper district, where the ore horizon usually has thickness below 2 m. Economic reserves are located within the horizon of 400–1350 m. The average Cu content in the ore is above 2 wt. %, cut off grade for the copper ores is 0,7 wt. % Cu. Rock salt as a side product of Polkowice-Sieroszowice mine is very important for Central European infrastructure during winter time – it is being used as tech-

nical salt. The salt production is enough for winter demand of Czech Republic, Slovakia and Poland. During the year 2013, 500.000 tons of salt were mined. Massive evaporite seat occurs from 631 to 1229 m which means it occurs just above the copper-bearing horizons. Average thickness of the rock salt strata in the Polkowice-Sieroszowice mine is from 0 to 186 m, with average of 65 m. Across the mine crystallinity of NaCl varies due to different contents of NaCl (increasing with

increasing crystallinity). The average content is determined at a level of 98.2%.

This trip would not be possible without the amazing help of the former SGA Baltic Chapter president Joanna Kolodziejczyk and we would like to thank her warmly for her help and the effort she put into this. Also we would like to thank Władysław Zygo and Jaroslav Prsek for accompanying us during the mine visits and to KGHM Company for making the underground visit possible.



Fig. 4. Salt exploitation and processing plant at the Polkowice-Sieroszowice mine.



Fig. 5. Participants of the excursion at the Polkowice-Sieroszowice mine.

# 4. Freiberg shaft, Terra Mineralia exhibition and several localities in the field (SGA Student Chapter Prague)

#### Ondřej Krátký, Marek Tuhý

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

The last excursion of 2015 led us to the German city Freiberg, where we visited the historical shaft and the Terra Mineralia exposition. On the second day it led us to several localities in the field on the Czech side of the border. This two-day excursion provided interesting insight into geology and history of mining in Saxony and it was a chance as well to visit one of the best mineral collection in the World. 22 students participated to this excursion.

Silver mining in Saxony has a long tradition. The center of this silver mining activities is considered to be the city of Freiberg founded in 1168 right after silver ore was here discovered for the first time. The newly founded city immediately attracted quantities of middle European miners. Proofs of more than 800 years of mining tradition are nearly 2000 kilometers of tunnels beneath the old town.



Fig. 1. Sulfide vein from the Freiberg shaft.

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We have visited the Bergwerk Freiberg which provides guided mine tours. Pb-Zn-Ag vein type mineralization in the Freiberg area is located within different types of gneisses which are the most common host-rock. Our next target was the Terra Mineralia exhibition located in the center of Freiberg. This magnificent exposition provided us overall vision of the typical world mineralogical localities and their best samples. More then 3500 samples in historical setting of the Freudenstein castle were a really powerful experience. All these samples are the property of Dr. Pohl-Ströher and the entire collection is considered to be one of the most valuable and most significant private collections in the world.

On the next day we visited several localities in the field on the Czech side of the border. We have started with the locality of Loučná, where leucite crystal up to 10 cm in size can be found. The source of these huge crystals is a weathered of dyke. In fact, the crystals are pseomorphosis after lecucite, now they are composed of micas and feldspars with leucite cores. Our next stop was the locality of Ahníkov. It is a former ultramafic body, which was lateritized in the tropical environment when the Bohemian Massif was moving across the equator. Nowadays, samples of pink and violet chalcedony in forms of veinlets and nodules can still be found.

We were lucky to find some nice specimens both of the leucite pseudomorphosis and chalcedony. We would like to thank our guide at the Freiberg shaft who made the visit very interesting and educational.

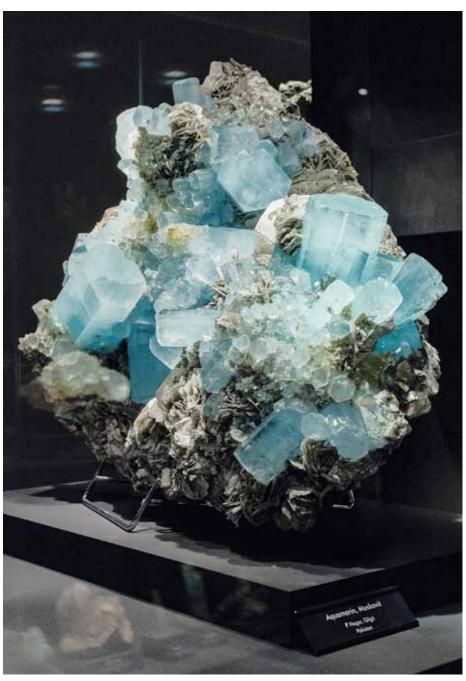


Fig. 2. Sample of aquamarine with muscovite from the Terra Mineralia exhibition.



Fig. 3. Malachite sample from the Terra Mineralia exhibition.



Fig. 4. Searching for chalcedony at the locality Ahníkov.

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#### 5. News from the Colombia-Bogotá SGA Student Chapter

#### Héctor R. Campos, Eduard F. Mora, Eduardo Torres

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The SGA Student Chapter Colombia-Bogotá in the National University of Colombia created on August 2015 currently consist of fifty-six students (1 PhD Student, 1 M.Sc. and 54 BSc students).

During the second semester of 2015 two fieldtrips were carried out, one to the city of Villa de Leyva, more as a social activity, whereas the other fieldtrip allowed a geological survey and characterization of mega-magnetite crystals outcropping near Sevilla, in the western foothills of the Sierra Nevada de Santa Marta. This fieldtrip was made together with the research group GEGEMA (Study Group in Economic Geology and Applied Mineralogy) led by Dr. Thomas Cramer, Professor of the Geosciences Department in the National University of Colombia and, also, Scientist Advisor of the SGA Student Chapter Colombia-Bogotá. The PhD student Amed Bonilla led the Sevillafieldtrip with 7 students (5 of the SGA, including Amed). The financial support for this fieldtrip was achieved thanks to a student project of GEGEMA approved by the Faculty of Science of the National University.

On the other hand, two conferences in the Geosciences Department, held by Timoleon Garzón, an exploration geologist with more than 30 years of professional experience, including 11 years as Principal Geologist, Projects Generation at Anglo Gold Ashanti, were attended by a broad audience. In the first conference, entitled Mineral exploration in Colombia, on September 9, he exposed the special conditions for the mineral exploration in Colombia, with many examples and helpful advices. In this context, Timoleon explained the discovery history of the La Colosa mine, a world-class gold-rich porphyry deposit, located 150 kilometers west of Bogotá, in which the gold mineralization is attributed to a porphyry intrusion into Paleozoic schists during the Miocene. La Colosa is considered the most important prospective gold district in the country and one of the biggest in



Fig.1 Fieldtrip to Sevilla, western foothills of the Sierra Nevada de Santa Marta, Colombia. From the left to right: María Fernanda Rendón, Johana Nevito, Carlos Suarez, Amed Bonilla. Photo by Jenny.



Fig.2 Fieldtrip to Sevilla, western foothills of the Sierra Nevada de Santa Marta, Colombia. From left to right: Wendy Gil, Juan Gongora, Amed Bonilla. Photo by Jenny Mesa.

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the world, with gold resources of, approximately, 30 Moz. In the second talk, about Porphyry type mineralizations in Colombia, on November 18, Timoleón exposed the history of several exploration processes and especially of Nuevo Chaquiro, a significant copper-gold porphyry-style mineralized system, located in the northwestern part of the country.

Finally, on December 2 the 2015 conference cycle was closed by Jorge Mantilla, a geologist with longstanding experience in hydrocarbon exploration and the management of construction material extraction projects. The main topics of the conference were building materials in Bogotá and its surroundings, but also the different types of construction materials used, their

exploitation state and processes, as well as their economic potential and risks of supplying the fast growing 9-million habitant capital.

To start our conference cycle in 2016, we organized a conference entitled "Mining and Environment in Sensitive Ecosystems" given by Carlos Sarmiento from the "Instituto de Investigación de Recursos Biológicos Alexander Von Humboldt", with more than 100 assistants. Sarmiento spoke about the variety of ecosystems in Colombia, explaining its most important characteristics of flora and fauna; subsequently he referred to the importance of Responsible Mining in the Country.

Among the future activities of the SGA Student Chapter Colombia-Bogotá

we plan further conferences and field trips, and the inauguration of our website (www.sgabogota.org). Of special importance is the program "Young Learners on ore deposits", where experienced geologists will give us seminars, and the students who have more knowledge in mineral deposits will give short courses on different topics to the younger ones. The organization of the increasing collection of minerals as well as polished and thin-sections and their future publication in the web-page will support these activities which are all aiming to the formation of responsible and highly qualified professionals and scientists.



Fig.3 Conference "Porphyry-Type Mineralizations in Colombia" given by Timoleón Garzón, Geologist MSc. Photo by Thomas Cramer.



Fig.4 Conference "Building Materials in Bogotá and Surroundings" given by Jorge Mantilla, Geologist.



Fig.5 Conference "Mining and Environment in Sensitive Ecosystems" given by Carlos Sarmiento from the Instituto de Investigación de Recursos Biológicos Alexander Von Humboldt.



Fig.6 Some members of the SGA Student Chapter Colombia-Bogotá. From the left to right: Eduardo Torres, Eduard Mora (Treasurer), Antonio J. Castañeda (Webmaster), Laura Chavez, José R. Tenjo (Vice-President), Héctor R. Campos (President), Amed Bonilla, Alejandro Fajardo, Zezé Amaya.

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# 6. Geological Excursion Through Ore Deposits in Czech Republic by the SGA Baltic Chapter with the SGA Student Chapter Prague

#### Filip Zych (a)\*, Dorota Pietruszka (a), Ondřej Krátký (b)

(a) AGH University of Science and Technology, Kraków, Poland (b) Charles University in Prague, Czech Republic

From 29th of April until 2nd of May a group of SGA Baltic Student Chapter members in collaboration with SGA Student Chapter Prague (Fig.1) organized and attended the excursion through the Czech Republic mineral deposits of the Bohemian Massif and Erzgebirge Mountains (Czech: "Krušné hory").

The program of the meeting included a fieldtrip to Mokrsko gold deposit, old uranium mine of Jáchymov, sightseeing Prague as well as a fieldtrip to several outcrops located within the Erzgebirge mountains.

The excursion started in the Mokrsko gold deposit (Fig.2), which comprises 3 genetically related deposits: Čelina, Mokrsko-West and Mokrsko-East, located in the prominent zone along the NW-boundary of the Central Bohemian Plutonic Complex in the Bohemian Massif. Au mineralization having a supposed genetic link with the intrusive-related type, is a result of Variscian metallogenic events connected with subduction-related magmatism and is characterized by quartz-dominated gangue, low sulfide content and lack of extensive alteration.



Fig.1 Participants of the excursion through the Czech Republic mineral deposits.

Despite the same genetic relations and E-W trending of almost horizontal dipping veins, the deposits differ in their host rock and vein features. Mokrsko-West, which is an example of world-class sheeted vein complex, is located mainly in amphibolebiotite tonalites (ca 354 Ma) and bears closely-spaced 0.1 – 5 mm thick quartz veinlets. On the other hand Mokrsko-East and Čelina deposits are hosted in the Neoproterozoic volcano-sedimentary sequence of the Jílové Belt and represent widely



Fig.2 Visit at Mokrsko gold deposit. Photo by Filip Zych.

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spaced 5-20 cm thick quartz veins with 1.5-4.0 g/t Au contents.

Gold occurs as invisible crystals with strong relation to arsenopyrite. In comparison with increased amount of pyrrhotite and pyrite in the metabasalts, arsenopyrite dominates in tonalites.

Current resources are estimated in 140 t of gold, where 90–100 t Au are emplaced in the Mokrsko-West deposit, 30 t Au in Mokrsko-East, and 11 t Au in Čelina.

At the end of the day, nearby the ccommodation the students had the opportunity to experience the feelings of a gold rush, panning gold in a stream located in the vicinity of Jílové u Prahy (Fig.3)

On Saturday morning 30th of April the participants departed in the direction of Prague, sightseeing the city as it was located through the patch to an old uranium mine in Jáchymov. During that activity students had the pleasure to visit great monuments as well as outcropping sedimentary folds of Devonian age in the capital of the Czech Republic.

In the afternoon apprentices left the city driving directly to Boží Dar where a short lecture about geology of the Bogemian Massif and Jáchymov deposit was given by students from Charles University in Prague – Ondřej Krátký and Marek Tuhý. (Fot.6)

On 1st of May early in the morning participants visited the Jáchymov uranium mine, closed in 1964. It is located in the Krušné Hory Mts. which are part of the Saxothuringian Zone of the Variscan orogenic belt. The Jáchymov deposit comprises a hydrothermal vein system of "five element" Ag-Bi-Co-Ni-U mineral association emplaced in granites, volcanic rocks and mica schists of the metasedimentary complex. Ore-bearing veins in the district strike mostly between 300° and 30°. Ore enrichment is observed in the proximity of large antiforms. The Jáchymov uranium mine is also known for its radioactive springs which were used for medical purposes since 1906. They are derived from the circulation of meteoric water, descending along fault and fracture zones deep into the metamorphic complex and to the underlying granite pluton. Inside the mine students had a chance to drink this water. (Fig.7) and also came across native arsenic accumulations (Fig.8) and had a possibility to look for silver mineralization and silver minerals.

In the afternoon students had the opportunity to see the Vlčí Jámy deposit – nowadays collapsed underground mine which



Fig.3 Gold Panning in the Jílové u Prahy area. Photo by Filip Zych.



Fig.4 Molybdenum crystals found in Krupka deposit. Photo by Filip Zych.



Fig.5 A photo of Pseudoleucites found by Dawid Mazur. Photo by Filip Zych.

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was exploited for the greisen-related mineralization (mainly tin). After this locality SGA members moved to the locality of Zlatý Kopec (meaning Golden Hill, but no gold there). The Zlatý Kopec deposit of tin, polymetallic and magnetite skarns is located 5 km from Boží Dar. Skarns are unusual rocks, which formed due to the intense metasomatism (and metamorphism) of impure limestone or dolomite near the contact with the intrusions of deep igneous rocks. The skarns at Zlatý Kopec form two tabular bodies enclosed in chlorite-sericite phyllites. The main ore mineral is magnetite, which is associated with zinc, copper and tin minerals. The average metal contents are 0.94-1.26 % Sn,

 $0.50{-}0.93~\%$  Zn,  $0.04{-}0.40~\%$  Cu and 13.95~% Fe.

At the end of the day, the last locality we visited was Loučná pod Klínovcem which is known for its pseudomorphosis after leucite crystals. The Loučná body is petrographically mostly nephelinite. Interesting are phonolite dykes in which the large crystals are located. Those are often 3 to 10 cm large (Fig.5), with composition of approximately 80 % K-feldspar and 20 % illite.

On 2nd of May students drove around 100 km to the next and last locality which was the Krupka deposit. The Krupka district hosts the greisen mineralization in six ore fields mostly restricted to the

contact zone of the hidden or exposed highly evolved granites. The greisen assemblages form lens-like, stockworks and/or vein bodies. The greisen lenses and stockworks consist of quartz, lithium mica and topaz with disseminated cassiterite, wolframite and scheelite. Great samples of molybdenum (Fig.4) and zinnwaldite were found.

Such interesting and successful trip would not be possible without help from our friends and guides from Charles University in Prague, Ondřej Krátký and Marek Tuhý. We are also grateful to SGA for partially funding our wonderful travel across Czech Republic mineral deposits.



Fig.6 Short lecture by Ondřej Krátký and Marek Tuhý. Photo by Filip Zych.

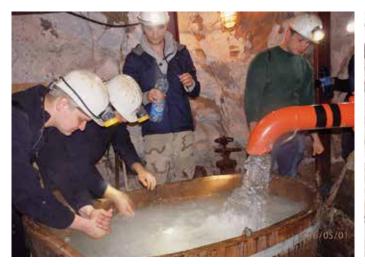


Fig.7 Radioactive springs in Jáchymov uranium mine. Photo by Małgorzata Nowicka.



Fig.8 Native arsenic vein. Jáchymov mine. Photo by Małgorzata Nowicka.

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#### 7. News from the Laval University-INRS-ETE - Québec SGA Student Chapter

#### Marjorie Sciuba, Arnaud Fontaine

Département de Géologie et Génie Géologique, Université Laval

The Université Laval – INRS-ETE Québec SGA Student Chapter organized a one-week field trip to the Sudbury basin in Ontario (Canada) with 8 graduate students, at the beginning of May 2016. The Sudbury basin was formed after a meteoritic impact at 1.85 Ga. This unique district is known as a world-class district for Ni-Cu-PGE mineralization. The deposits, associated with the meteoritic event and formed along contacts and in off-set dykes, are mined since the XIX century. The field trip included one day with Dan Farrow (Ontario Geological Survey) who led us to outcrops located within an N-S transect in the Sudbury

Igneous complex. There we had the chance to learn about the regional geology and the main lithologies exposed. The group also visited the Vale exploration core shack and outcrops on Vale properties, located South of the impact. The explanations were given by Peter Lightfoot (chief geologist at Vale Brownfield Exploration). Peter Lightfoot highlighted the different mineralization types in the Sudbury basin as well as the current theory about the formation of this basin using lithogeochemical data. We also had the opportunity to visit a 2 km outcrop near the Whistle-Podolsky mine (NE of the impact) with KGHM geologists and had a

look to mineralized cores of their current exploration project Victoria (SW of the impact). The group joined the excursion organized by the 2016 Northwestern Ontario Mines and Minerals Symposium to the Wallbridge Parkin Offset property, to visit the offset dyke Cu-PGE mineralization. After 5 days learning about Cu-Ni-PGE mineralization, we visited the Kipawa REE exploration project (Matamec Exploration Inc) lead by Frédéric Fleury (Université Laval). This syenite-hosted mineralization consists mainly of eudialyte and monzandrite associated with agrilite, amphiboles, pyroxene, britholite and fluorite.



Fig. 1: Vale exploration core shack. On the table mineralized core from the Victor exploration target.



Fig. 2: Typical mineralization of the Sudbury Ni-Cu-PGE mining camp consisting of chalcopyrite, pentlandite, pyrrhotite, and local millerite.



Fig. 3: Group picture on the Podolsky offset-dyke, KGHM property. From left to right, standing: Steven Gregory, Bill Spicer (KGHM), François-Xavier Masson (UL), Vincent Dubé-Bourgeois (INRS), Donald Grzela (UL); sitting: Vivien Janvier (INRS), Marjorie Sciuba (UL), Arnaud Fontaine (INRS), Chao Yang and Haiming Liu (UL). Photo by V. Janvier.



Fig. 4: Mineralization at the Kipawa deposit consisting of eudialyte and monzandrite associated with agrilite, amphiboles, pyroxene, britholite and fluorite.

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# Ore Deposits and 3D/4D modelling in Northern Fennoscandia – Fruitful knowledge exchange about one of Europe's most prospective regions for metal exploration

Tobias C. Kampmann (a)\*, Pietari Skyttä (b), Tobias E. Bauer (a), Edward P. Lynch (c)

a Luleå University of Technology, Sweden, b University of Turku, Finland, c Geological Survey of Sweden

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The Archean to Paleoproterozoic northern Fennoscandian Shield is one of the few remaining geological domains in Europe with significant potential for new base and precious metal deposit discoveries. The region hosts several ore districts, among them the Norrbotten and Skellefte ore districts of Sweden and the Peräpohja belt of Finland, including areas which are still considered under-explored. Numerous mines operate profitably in the area which has led to increased exploration efforts for a large variety of deposit types including, but not restricted to, volcanogenic massive sulphide, porphyry, IOCG and magmatic Ni-Cu deposits. Due to the complex tectonothermal modification of rocks and ore

deposits, there is a common interest among geoscientists from academia, national surveys and industry to share their knowledge about the region and jointly develop their ideas

In an attempt to motivate a dialogue between researchers and exploration companies active in Northern Fennoscandia, a two-day seminar (Sept. 7 and 8, 2015) was organized at Luleå University of Technology (LTU), in close cooperation with the SGA Baltic Student Chapter and the Turku (UTU) and Åbo Akademi Universities, Finland. Invited speakers included personnel from LTU and UTU, the geological surveys of Sweden (SGU) and Finland (GTK), as well as the mining and exploration compa-

ny New Boliden AB. SGA kindly sponsored the travel costs for SGA Keynote Speaker Dr. Pasi Eilu (GTK) who gave a thorough overview of gold deposits in the region. In addition to more classical studies on the formation of the different deposit types and districts, which were the main focus during Day 1 of the seminar, 3D/4D modelling involving the integration of geological, geophysical and lithogeochemical data forms an important research tool in the region. Thus, modelling in 3D space from deposit to district and belt scale has aided the unravelling of complex structural geometries in the region and was the focus during Day 2 of the seminar. The scientific talks during the seminar included the following:



Group photo of participants at the SGA seminar on Northern Fennoscandian ore deposits and 3D/4D modelling, 2015. Photo by P. Skyttä

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Monday, Sept. 7 – Ore deposits of Northern Fennoscandia:

What economic geologists need to know about geometallurgy – Pertti Lamberg (LTU)

VMS deposits in the Skellefte district – Roger Nordin (Boliden)

Cu deposits in northern Sweden – Roger Nordin (Boliden)

SGA-sponsored lectures: Metallogeny of gold in northern

Fennoscandian shield – Pasi Eilu (GTK) Tuesday, Sept. 8 – 3/4D-modelling of ore deposits and districts

Finding the right scale: Local geological and geophysical field studies

to understand Norrbotten geology – Stefan Luth (SGU)

Modelling of deposits from deposit to Belt-scales – Tobias Bauer (LTU)

Interpretation of geophysical data from the Nautanen area – Thorkild Rasmussen (LTU)

3D quantitative mineral potential targeting in the Skellefte District, northern Sweden – Tobias Hermansson (Boliden)

GIS-methods in exploration potential mapping – Vesa Nykänen (GTK)

Geological 3/4D-modelling in Finnish Lapland – Tero Niiranen (GTK)

Belt-scale restorations from the Peräpohja Belt – Pietari Skyttä (UTU)

Prior to the seminar, a three-day field course (Sept. 3–5) to the highly prospective area around the Nautanen Shear Zone near the town of Gällivare, Sweden, was organized by Dr. Pietari Skyttä (UTU), Dr. Tobias Bauer (LTU) and Edward Lynch (SGU). An international group of 40 students from Finland, Sweden and Poland,

including ten SGA students participated in the course. The focus was on hands-on mapping of structural features, as well as systematics of hydrothermal alteration associated with ore deposits in the area. Currently mined deposits spatially associated with the high-strain ductile deformation zone at Nautanen include the giant Aitik Cu-Au-Ag deposit, the Malmberget apatite-bearing iron oxide deposit, as well as the historical Nautanen Cu-Au deposit. Field experience in areas with such a high abundance of world-class deposits is vital for the next generation of exploration geologists. The participating students will hopefully be able to apply the gained knowledge for both exploration and research in Northern Fennoscandia in the future.

The seminar was followed by an excursion for the student group to the Peräpohja belt in northern Finland, organized by Dr. Pietari Skyttä, on Sept. 9. Pietari showed recent results of a research project at UTU, with the aim to get an insight into the tectonic framework of the area. Since the Peräbohja belt is considered an under-explored district for base and precious metals, this project may form the necessary structural basis for future exploration work. The excursion thus presented an excellent opportunity for the students to get acquainted with the lithologies and structures in this belt with high potential for future deposit discoveries.

We wish to thank SGA and the industry sponsors Boliden Mines, LKAB and Agnico Eagle Mines Ltd. for their financial support which made this event possible.



Field lecture by Dr. Tobias Bauer with a panorama view of Swedish Lapland during the field course. Photo by P. Skyttä.

All the speakers are acknowledged for presenting both finalized and ongoing research projects in Northern Fennoscandia. The high number of participants in the seminar (67 in total from three different countries, including 40 students) shows the great interest in events like this as an opportunity to share and discuss research in a challenging geological environment such as the Fennoscandian Shield. We are confident that similar events can be organized in the future.



Dr. Tobias Bauer (LTU) and Edward Lynch (SGU) introduce the geology around the Nautanen Shear Zone, Norrbotten ore district, Sweden. Photo by P. Skyttä.



The students examine the rocks exposed at the old mine field of the Nautanen Cu-Au Deposit. Photo by P. Skyttä.

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# >>> FORTHCOMING EVENTS <<<

#### \* marks a new entry

#### 2016

#### July 10-15

International Geoscience and Remote Sensing Symposium (IGARSS), Beijing, China. Contact: http://www.igarss2016.org/

#### July 26-29

Conference on Enceladus and the Icy Moons of Saturn, Boulder, United States. Contact: http://www.hou.usra.edu/meetings/enceladus2016/

#### August 1-3

Unconventional Resources Technology Conferences (URTeC), San Antonio, United States. Contact: http://urtec.org/2016/Why-URTeC/About

#### \*August 23-September 1

Summer school "Volcanism, Plate Tectonics, Hydrothermal Vents and Life", Angra do Heroísmo, Portugal. Contact: Wolf Geppert; Phone: [++46855378649]; Email: wgeppert@hotmail.com; http://www.nordicastrobiology.net/Azores2016

#### August 24-26

Atlantic Conjugate Margins Conference, Ipojuca, Brazil. Contact: http://www.conjugatemargins.com.br/index.html

#### August 27-September 4

35th International Geological Congress, Cape Town, South Africa. Contact: http://www.35igc.org/

#### \*August 31-September 2

9th Geosymposium of Young Researchers "Silesia 2016", Kroczyce, Poland. Contact: http://www.geosymp.wnoz.us.edu.pl

#### \*September 5-9

WMESS 2016 – The World Multidisciplinary Earth Sciences Symposium, Prague, Czech Republic. Contact: http://www.mess-earth.org/

#### September 5–9

13th International Nickel-Copper-PGE Symposium, Perth-Fremantle, Western Australia. Contact: http://www.iagod.org/node/58

#### September 5-9

International Conference on Mars Polar Science and Exploration, Reykjavík, Iceland. Contact: http://www.hou.usra.edu/meetings/marspolar2016/

#### September 11-15

2nd European Mineralogical Conference, Rimini, Italy. Contact: http://emc2016.socminpet.it/

#### \*September 18-22

11th International Kimberlite Conference, Gaborone, Botswana. Contact: http://www.11ikc.com/

#### September 25-28

SEG 2016 Conference – Tethyan Tectonics and Metallogeny, Cesme, Turkey. Contact: www.seg2016.org

#### September 25-28

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

#### October 23-26

GRC Annual Meeting, Sacramento, United States. Contact: http://www.geothermal.org/meet-new.html

#### October 31-November 6

African Rift Geothermal Conference (ARGeo), Asmara, Eritrea. Contact: http://theargeo.org/files/ARgeo-C6%20Flyer.pdf

#### \*November 25-27

ACROFI VI, Mumbai, Maharashtra, India. Contact: http://www.2016acrofi.in

#### December 4-10

American Exploration and Mining Association Meeting, Reno, NV, USA. Contact: www.miningamerica.org

#### December 11-14

Arabian Plate Geology Workshop, Abu Dhabi, United Arab Emirates. Contact: http://www.eage.org/event/index.php?eventid=1406

#### 2017

#### \*February 21-23

Gold17@Rotorua, Rotorua, New Zealand. Contact: http://www.rotoruagold17.co.nz

#### \*April 23-28

European Geosciences Union (EGU) General Assembly, Vienna, Austria. Contact: http://www.egu2017.eu/

#### \*May 29

Protoplanetary disks and planet formation and evolution, Garching by Munich, Germany. Contact: http://www.munich-iapp.de/scientific-programme/programmes-2017/protoplanetary-disks/

#### June 4-7

FUTORES II (Future Understanding of Tectonics, Ores, Resources, Environment and Sustainability), Townsville, Australia

#### \*July 4-8

SEGH 2016 – 32nd International conference of Society for Environmental Geochemistry and Health, Brussels, Belgium. Contact: http://seghbrussels.sciencesconf.org/

#### \*August 4-9

EMSMD – Magmatism of the Earth and related strategic metal deposits, Miass, Russia. Contact: Victor Zaytsev; e-mail: alkaline.conference@gmail.com; http://emsmd.ru/

#### \*August 13-18

Goldschmidt Conference, Paris, France. Contact: http://goldschmidt.info/2017/

#### \*August 20-23

SGA 2017 – 14th Biennial Meeting of Society for Geology Applied to Mineral Deposit, Québec, Canada. Contact: http://sga2017.ca/

#### \*October 2-6

International Earth Science Colloquium on the Aegean Region, IESCA-2017, Izmir, Turkey. Contact: http://iesca.deu.edu.tr/

#### October 22-25

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

#### December 3-9

A merican Exploration and Mining Association Meeting 2017, Spokane, Washington, USA. Contact: www.miningamerica.org

#### 2018

#### August 13-17

IMA 2018 – XXII Meeting of the International Mineralogical Association, Melbourne, Victoria, Australia. Contact: http://www.ima2018.com/

#### November 4-7

The Geological Society of America (GSA) 2018 Annual Meeting, Indianapolis, United States. Contact: http://www.geosociety.org/meetings/ Number 39 August 2016 SGA News 29 <<<

# Obituary Prof. Dr. Z. Johan, DrSc. (1935 – 2016)

Zdenek Johan, the former SGA President (1995–1996) and the first recipient of the SGA-Newmont Gold Medal (2007), passed away on the 13th February 2016.

He was born on November 18, 1935 in Lomnice nad Popelkou (former Czechoslovakia). Dr. Johan graduated from Charles University, defending a thesis on the "Mineralogy and metallogeny of the Černý Důl deposit, Giant Mountains" (1957). He received his Ph.D. with the dissertation "Mineralogical and physical-chemical study of the binary Cu-As system" (1965).

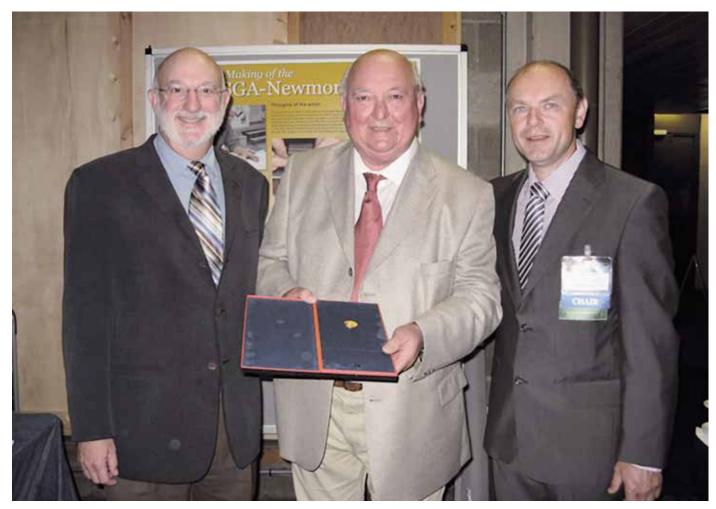
Since that time he has authored and/or co-authored more than 200 papers on various research topics that were published in various scientific journals and monographs.

Dr. Johan has long been an icon in the world of mineral sciences, and more specifically of the mineralogy and origin of ore deposits, and has been regarded as such for several decades. He was involved in the description of as many as 33 new mineral species. The Atlas of Ore Minerals, co-authored with Pickot remains a classic reference work nothing better yet produced even on internet. His research interests have taken him beyond the minerals themselves to the environments in which they form, especially ophiolite complexes, layered intrusions, and Uralian-Alaskan intrusions. He changed our understanding of the geological processes that form platinum group elements and chromium deposits in mafic and ultramafic rocks of various settings. For his whole life outstanding contribution to economic geology he became the first recipient of the most prestigious SGA award - the SGA-Newmont Gold Medal.

Beside his own research he supervised 28 research theses that were successfully defended.

Zdenek Johan's leading role was recognized in B.R.G.M. (Orléans), where he continued his carrier after the occupation of Czechoslovakia in 1968. He became the director of the B.R.G.M.-CNRS group "Fundamental and applied metallogeny" and was later director of the CNRS "Centre de recherches sur la synthés et la chimie des mineraux" for 12 years. After his return to B.R.G.M. he served as research director and inspector general until 2000.

His research results led several national geological societies and international organisations to use his expertise, his open and friendly nature and readiness to co-operate (amongst others IUGS, International Mineralogical Association,



Zdeněk Johan holding the SGA-Newmont Gold Medal with Stephen Enders (Newmont Mining Representative – on left) and Jan Pašava (SGA Executive Secretary – on right) who nominated Z. Johan for this most prestigious SGA Award. The award is given to selected individuals for extraordinary career contribution to economic geology in the form of published scientific research and also leadership in both research and industry, success in exploration or mining geology and service to SGA and like organizations (Dublin, August 20, 2007). Photo by LOC.

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UNESCO, IAGOD.) He served as President of the Society for Geology Applied to Mineral Deposits from 1995 to 1996.

Dr. Johan's contributions to science and society have been recognized by many organizations as evidenced by his corresponding membership of both the French and Austrian Academies of Science, his membership of the Russian Academy of Sciences, his receipt of 7 medals for distinguished work in science and his receipt of an honorary doctorate from Carleton University. He also became a Rider in the French National Order of Merit and Rider in the French National Order of "Palmes Académiques". His full and happy integration into French life has been accentuated by acting in the role of mayor in Isdes (Loiret), where he lived with his wife Vera.

Many of us have been fortunate to be able to enjoy Dr. Johan's scientific results and his friendly temperament. Anyone who had a chance to listen to his piano playing and singing is not surprised that in his youth he had to choose between a career as a singer and a geoscientist. It was to the good fortune of the earth science community that he chose the latter. He will be missed and remembered as a great personality and scientist.

# Some of reactions from international scientific community:

"We are deeply sorry to hear about such a loss. On behalf of SGA, I would like to express our heartfelt sorrow and condolences to the family on the passing of your husband. Dr. Zdenek Johan, former SGA President and the first recipient of the SGA-Newmont Gold Medal, will be truly missed and always remembered as a great man by his friends and colleagues at SGA."

Jorge Relvas Professor, University of Lisbon President, Society for Geology Applied to Mineral Deposits

"I would like to add to the numerous expressions of sadness and condolences for a wonderful scientist and gentleman. Zdenek made me extremely welcome when I was on a sabbatical tour of mineral deposits and research organizations in France in 1981 – a kindness never forgotten and some special memories."

Robert Foster CEO, Stratex International Plc President, Society for Economic Geologists "This is very sad news. Zdenek Johan had an extraordinary life and influenced a large number of people. His family should be very proud of him."

David Groves Emeritus, University of Western Autralia Former SGA President

"What a great loss to the earth sciences! Please convey my condolences to all that were close to him. May his soul rest in eternal peace!"

> Gabi Schneider Former Director General, Geological Survey of Namibia

"I have fond memories of Zdenek, I remember being on a field trip with Zdenek in Oman when I was a post doc student. He was very much the life and soul of the trip. My over riding memory of him is that on a fairly long walk along a wadi to see a chromitite we encountered a pool in a narrow section of the wadi. We had to go around it on a small ledge. Zdenek slipped and disappeared into the pool - all we could see were bubbles and a hand above the water with his camera out of the water. He was fine and surfaced quickly. I learnt a few new words of French."

Prof. Dr. H. Prichard Cardiff University, UK

"I feel very sad for the passing away of Zdenek Johan. We had so nice collaboration for many years in organizing CODMUR meetings, platinum symposia and SGA, and he was instrumental in the participation of BRGM in the GeoNickel programme. I'm happy that I learnt to know such a great personality. We all are missing him."

Heikki Papunen Emeritus Professor of Econmic Geology Turku University, Finland (former SGA President)

"I can echo the sentiments expressed at this sad occasion. Zdenek was instrumental for me to spend a few weeks at CNRS/BRGM in 1980 and was extremely generous in measuring the reflectance for many PGM used in CIM Special Volume 23 on the PGE. Zdenek could not abide with bureaucratic nonsense and was an outstanding scientist and manager, proficient in many fields including crystallography, mineralogy, as well as mineral deposits. He attacked all issues with verve, enthusiasm and great energy. It was also a distinct pleasure to dine with him where the quality of a vintage was part of the conversation.

He will be missed."

Louis Cabri, Canada

"Just few words to express my sadness and reconnaissance...

I had the privilege to work under his leadership at the BRGM during several years and collaborate with him after the fall of the Berlin wall to develop cooperation with former Central Eastern block. As I communicated with Vera this morning, he gave me opportunities that changed my career thanks to his vision of science and his mentorship. Je lui dois beaucoup!"

Patrick Ledru AREVA Resources Canada Inc.

"Very sad news indeed. One of the greats of European mineral deposit geology. He influenced very many geoscientists and indeed politicians in his time and will be remembered for his great contribution to our science. Our very best wishes are with his family."

Richard Herrington NHM London, UK

"I also feel very sad for Dr. Zdenek Johan's passing. As a young geologist, I only know him from textbook (such as Zdenekite, a mineral named for him), but he is an icon in my heart."

> Huayong Chen, Guangzhou Institute of Geochemistry, China

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In Prague, May 5, 2016

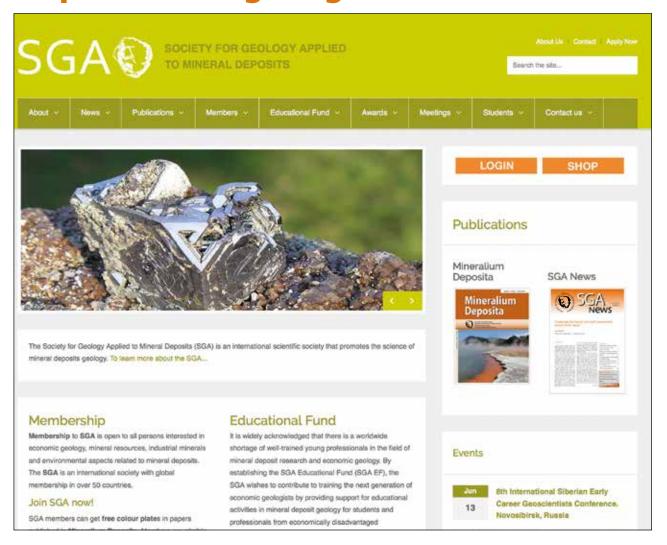
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#### **Keynote Speakers:**

#### Shaun Barker -

University of Waikato, New Zealand Alteration and Geochemical Signatures of Low-Sulfidation Epithermal Veins

David Cooke - CODES (TMVC), University of Tasmania, Australia Epithermal Gold Deposits of the Circum-Pacific - Characteristics, Genesis and Exploration

#### Dave Craw -

University of Otago, New Zealand Fluids and Orogenic Gold in South Island, NZ

#### Julie Rowland -

University of Auckland, New Zealand The Influence of Inherited Structure on Localisation of Epithermal Gold Mineralisation

#### Stuart Simmons

EGI, University of Utah, USA Spatial and Temporal Variations in Epithermal Ore-Forming Processes

John Thompson — Cornell University, USA & Petrascience Consultants, Canada Hydrothermal Alteration in Gold Systems — A Spectrum of Processes Gold17 will focus on developments in gold mineral systems, exploration technologies, opportunities and Pacific margin geology and mineralisation

TITLE	TYPE	PRESENTERS/ LEADERS	TIMING	DETAIL
Southern South Island Gold	Field trip	Dave Craw	Sun 12th Feb to Sat 18th Feb	Pre- symposium 6 days
Taupo Geothermal	Field trip		To be confirmed	One day
Waihi gold mine	Mine visit	Oceana Gold	To be confirmed	One day
White Island	Field Trip		To be confirmed	One day
Epithermal Mineralisation	Short course	David Cooke and Stuart Simmons	Sunday 19th & Monday 20th Feb	Two days
Gold17@ Rotorua	Symposium		Tues 21st to Thurs 23rd Feb	THREE DAYS
Structure, Gold, Drill Core and Modern Digital Technologies	Short course	Sian Bright and Julian Vearncombe	Friday 24th Feb	One day with drill core exercise
North Island Geothermal and Epithermal	Field trip ex-Rotorua	Stuart Simmons and Tony Christie	Sat 25th to Tues 28th Feb	Post- symposium 4 days

FOR FURTHER INFORMATION: For further information on this event or to discuss sponsorship opportunities contact rotorua2017@geosymposia.com.au

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# 10th Ore Deposits Models and Exploration Workshop

#### Meng-xi Wang

Chang'an University, Xi'an, China

The 10th annual Ore Deposits Models and Exploration Workshop was held at Chang'an University, Xi'an, China, on 11–14 November 2015, for the purpose of communicating the latest achievements in ore deposits research around the world and for enhancing the exploration level for mineral resources in China.

This popular workshop was sponsored by the Society for Geology Applied to Mineral Deposits (SGA), Society of Economic Geologists (SEG), Chang'an University and the Xi'an Center of the Geological Survey, China Geological Survey (CGS). Chang'an University, the chief organizer, is a key university administered by the Chinese Ministry of Education and is supported by Project 211. It features educating professionals in road traffic engineering, land

resources and the environment, and urban and rural construction. Professor Jiangang Jiao of the School of Earth Science and Resources, Chang'an University, Professor Steven Scott of the Earth Sciences department at the University of Toronto and his wife Joan Scott directed the affairs of the workshop, including daily laboratory sessions.

Nine economic geologists from 4 countries introduced the metallogenic models of world-class deposits and their applications in exploration, and displayed in the labs suites of typical samples from important deposits around the world. Instructors were as follows:

Steven Scott: Emeritus Professor at the University of Toronto, Fellow (Academician) of the Royal Society of Canada, lectured on ore deposit models and ex-

ploration for VMS and seafloor massive sulfide deposits;

David Leach: Former senior research geologist at the United States Geological Survey, former President of the SGA lectured on MVT and Sedex deposits;

Noel White: Former chief geologist of the giant Australian company BHP, Professor of Hefei University of Technology. He lectured on ore deposits models and their use in exploration with case histories as well as on iron ores;

Richard Goldfarb: Senior research geologist at the United States Geological Survey and former President of the SEG lectured on gold deposits;

David Cooke: Deputy Director of CODES, the Australian Research Council's Centre for Excellence in Ore Deposits, and a Professor at the University of



A group photo for the delegates, instructors and organizers on the campus of the Chang'an University.

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The chairman of the workshop, Professor Steven Scott of the University of Toronto, gave a welcoming speech at the opening ceremony.

Tasmania. He lectured on porphyry and intermediate/low sulfidation epithermal deposits;

Chusi Li: Senior scientist at Indiana University, lectured on magmatic Ni-Cu-PGE sulfide deposits;

Kaihui Yang: Former president of Asia Now Resources and now a consultant to the Zijin Mining Group. He lectured on Chinese mineral exploration; Zhaoshan Chang: Professor at the James Cook University, lectured on high sulfidation epithermal deposits and on skarns;

Huayong Chen: Professor at the Guangzhou Institute of Geochemistry, Chinese Academic of Sciences, lectured on Ironoxide Cu-Au (IOCG) deposits.

There were 176 delegates registered for this workshop. They came from 4 countries and 53 organizations which included 8 universities, 11 research centers and institutes and 34 geological teams and mining companies.

Steve Scott and Joan Scott have organized this annual workshop during the past ten years and have now retired. The next workshop will be organized by Professor Huayong Chen (huayongchen@gig.ac.cn), and held in Haikou, Hainan Province, China, on 7–12 November 2016.

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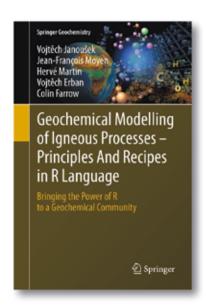
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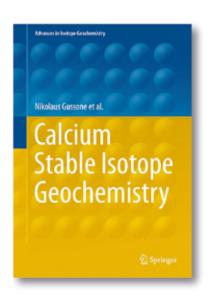
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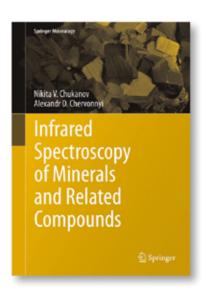
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503 SCZ

- modeling
- Linkages amongst iron-oxide alkali-altered systems: from metasomatism to orogenic metamorphism
- Detecting the alteration footprint around porphyry 555
  - Exploration management and targeting with 3D copper deposits
- Field portable instrumentation multidisciplinary models 507

# Field trips

Geology, geodynamics and metallogeny of the Rhyacian (2.35 - 2.05 Ga)

Sessions

Ore-forming magmatic-hydrothermal processes along active margins

Exhalative mineral deposits: key controls on the quality (size and/or

- Physical volcanology and metallogenesis of the Ni-Cu-PGE deposits in the Cape Smith Belt, Québec, Canada A-01
- mineralizing systems of the Grenville Province, Canada Iron oxide and alkali alteration, skarn and epithermal A-02:
  - Gold mineralization in the Guyana Shield, Guyana and Suriname, South America
- Geological and historical heritage of Québec fortified city and Montmorency falls park (for geoscientist/student) / Québec 8-01

Geometallurgy: risk reduction through communication, optimization and

Resources development and perception/acceptability: The role of

How can government promote exploration success?

nnovation

510

Gem research: Beautiful windows into earth's interior

geosciences

General session - posters only

From fertility to footprints: New vectoring tools for mineral exploration

Developments of geochronological methods and their application to

date ore forming events

S08:

The impact of the supercontinent cycle on ore formation

Iron ore - deposit to global scale processes Uranium deposits: from source to ore grade) of deposits and districts

Precious and base metal deposits of the southern Abitibi greenstone belt, Superior Province, Canada

fortified city: geological and historical heritage (for all)

- Stratigraphic and metallogenic context of the Sokoman Iron Formation in the Labrador Trough near Schefferville, Québec-Labrador, Canada
- Geologic setting and iron oxide deposits of the mesoproterozoic St. Francois Mountains, Southeast Missouri, USA

