

# WORKSHOPS

## WORKSHOP 1. APPLIED STRUCTURAL GEOLOGY IN MINERAL EXPLORATION AND MINING: A PRACTICAL WORKSHOP

- 2 days – Pre-meeting workshop – 22<sup>th</sup> and 23<sup>th</sup> of August 2015

SRK is pleased to offer a professional development workshop consisting of practical technical training in structural geology developed for the exploration and mining industry.

The workshop material is designed to provide the attendee with a broad knowledge of salient concepts in structural geology applicable to mineral deposits and to equip the attendee with key practical skills that will enable them to interpret a wide range of structural data and therefore make informed decisions in areas of structural uncertainty.

Designed to be of real-world practical use, the workshop is planned to consist of 2 days of lectures (50%) and practical exercises (50%) that draw on the global experience of SRK's structural geologists and include case studies which demonstrate the application of structural geology to a range of industry-related issues (e.g., exploration, mining, rock mechanics and Mineral Resource projects).

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## WORKSHOP 2. INTENSIVE COURSE IN GEOPHYSICS: GRAVIMETRY AND MAGNETOMETRY APPLIED TO EXPLORATION

- 2 days - Pre-Meeting workshop – 22<sup>th</sup> and 23<sup>th</sup> of August 2015

This intensive course, intended for geologists with limited knowledge of geophysics, introduces gravimetry and magnetometry. In addition to reviewing the theory of potential field methods, the course covers data processing and correction, spectral analysis techniques, and source separation and enhancement techniques, to show how geological and structural information can be best extracted from data for use in exploration programs. Results interpretation methods and case studies are also presented to illustrate the theoretical concepts.

- **Day 1 – Theory**
  - Review of gravimetry theory
  - Review of magnetometry theory
  - Data processing
  - Spectral analysis, source separation, enhancement
- **Day 2 – Applications and Case Studies**
  - Processing to help visualize geological units and sophisticated structures
  - Mapping of deep structures
  - Applications for Archean terranes and high-grade metamorphic belts

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### WORKSHOP 3. AGROMINING: FROM SOILS TO REFINED METAL PRODUCTS

- 2 days - Pre-Meeting workshop - 28<sup>th</sup> and 29<sup>th</sup> of August 2015

Agromining (a wider concept than Phytomining) is an emerging technology aimed at recovering metals from plants grown on low-grade ores, mining and industrial waste, or mineralized soils. It is based on domestication and culture of plants that possess the exceptional ability to take up metals with their roots (hyperaccumulators). The technology has expected outcomes in degraded land restoration and metal-rich waste treatment, thus providing an additional source of income to restoration projects.

The workshop is aimed at addressing key questions including: How can hyperaccumulators be used, from discovery to application, to improve the outcomes of mine site restoration? Where does the greatest potential for agromining lie? What are the new metallurgical pathways for treating the bio-ores and expected products? What is needed to develop large-scale trials and pilot-scale biomass treatment units towards full commercialization?

The leading scientists responsible for initiating and developing phytomining and agromining worldwide will provide participants with the most recent scientific advances and feedback from field experience.

- **Day 1 – Metal hyperaccumulation and sources of metals**
  - The scientific basis of metal hyperaccumulation by plants (mechanisms, biology and ecophysiology)
  - The global diversity of metal hyperaccumulators and their potential use in agromining projects
  - The biogeochemistry of metals of interest in soils, mine and industrial waste
  - Rhizosphere and microbial processes to enhance metal uptake by hyperaccumulators
  - Rehabilitation of nickel laterite mining waste (New Caledonia, Brazil, Indonesia)
- **Day 2 – Agromining and metal recovery**
  - The agronomics of agromining operations
  - Cropping systems for Ni agromining (experiences in Albania, USA, Indonesia)
  - Production of refined products from bio-ores

A visit to agromining field trials set up at the GISFI experimental station will be organized.

- **Contact:** Guillaume ECHEVARRIA, Université de Lorraine-INRA, LSE and Jean-Louis MOREL, Université de Lorraine-INRA, LSE - [guillaume.echevarria@univ-lorraine.fr](mailto:guillaume.echevarria@univ-lorraine.fr)

### WORKSHOP 4. SPECTROSCOPIES FOR FIELD WORK

- 3 days - Pre-Meeting workshop - 21<sup>th</sup> to 23<sup>th</sup> of August 2015

Spectroscopic setups designed for field work applications are useful tools for gathering the best possible data during field investigations. This short course intends to review the physical basis on which spectroscopic tools rely and the technical breakthroughs that have enabled some of these techniques to be employed in the field. Practical sessions will be dedicated to testing the possibilities and limitations of a selection of techniques. The field tools under consideration are: X-Ray Fluorescence, Gamma-ray Spectroscopy, Raman, Infrared, Laser-Induced Breakdown Spectroscopy and X-Ray Diffraction. Contacts are currently being taken and the actual techniques available will be advertised at later date.

- **Contact:** Jean CAUZID, Université de Lorraine-GeoRessources - [jean.cauzid@univ-lorraine.fr](mailto:jean.cauzid@univ-lorraine.fr)

## WORKSHOP 5. FLUIDS AND METALS

- 2 days - Pre-Meeting workshop – 22<sup>th</sup> and 23<sup>th</sup> of August 2015

Fluids play a key role in the formation of ore deposits via the transport and the deposition of metals. What are the main geological fluids and their metal contents? What are the key parameters that must be known for deciphering the source-transport-deposition processes? What information can be derived from fluid inclusions in terms of P-T conditions, fluid-rock interactions, and fluid mixing and un-mixing, using microthermometry associated with phase diagrams and analytical techniques (Raman, LA-ICP-MS)? Complete understanding of an ore-forming process also requires knowledge of the parameters which control the solubility of metal-bearing phases. Experimental studies of mineral solubility, including metal speciation, and stability constants of dissolved metal-bearing species may allow ore-formation processes to be modeled. This short course will focus on the following items:

- Metals and main types of geological fluids. Questions addressed to establish conceptual models.
  - Petrography of fluid inclusions and relating them to the geological context
  - Reference chemical systems, thermodynamic models and their use in estimating density-composition data; fluid mixing and unmixing processes
  - Experimental and thermodynamic analysis of solubility of metal-bearing minerals in fluids
  - Case studies of ore-deposits (4): halogens, metal analysis, stable isotopes, and modeling.
  - Practice: observation of certain phase changes with temperature; Raman and LA-ICP-MS analysis.
- **Contact:** Jean DUBESSY, CNRS-GeoRessources - [jean.dubessy@univ-lorraine.fr](mailto:jean.dubessy@univ-lorraine.fr)

## WORKSHOP 6. MODELING MINERAL DEPOSITS IN 3&4D

- 3 days - Pre-Meeting workshop - 21<sup>st</sup> to 23<sup>rd</sup> of August 2015

This workshop is designed for geoscientists involved in characterizing and evaluating mineral resources using integrated 3D computer earth models. The program will introduce participants to geological modeling, target assessment, and deposit model building by combining and interpreting data from different geo-scientific disciplines (e.g. geology, geophysics and geochemistry). Notions of geological interpretation (rock classification, surface to sub-surface reconciliation, scale issues), structural modeling including faults, fractures and deformation modes, 3D geological model building (implicit and explicit methods), geophysical inversions (potential fields, electrical and EM methods, constrained and lithology-based scenarios), reserve estimation and structural history (3D/4D models based on restoration techniques) will be reviewed. A number of cases studies will be selected from different areas to illustrate the concepts addressed in the course. The participants will practice on the computer using gOcad and various plug-ins developed by Mira geo-science and the gOcad consortium.

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## **WORKSHOP 7. LATEST ADVANCES ON THE UNDERSTANDING OF THE GENESIS OF Ni-Cu-PGE MINERAL SYSTEMS AND ASSOCIATED REVIEW ON EXPLORATION TARGETING**

- 1 day - Pre-Meeting workshop - 23<sup>rd</sup> of August 2015
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## **WORKSHOP 8. SOCIETY OF ECONOMIC GEOLOGY WORKSHOPS ON THE GEOLOGY AND GEOCHEMISTRY OF GOLD DEPOSITS**

- 2 days - Pre-Meeting workshop – 22<sup>th</sup> and 23<sup>th</sup> of August 2015

This workshop will cover all aspects of gold deposit characteristics, their genesis, and their exploration, with overviews on gold in geothermal systems, low and high sulfidation epithermal deposits, gold-bearing porphyry deposits, reduced intrusion-related gold systems, Carlin ores, and orogenic gold deposits.

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