interval short enough to transport very dense magmas (*e.g.*, seismic pumping), or a very viscous enclosing medium (*e.g.*, podiform chromitites). In case of a low-viscosity magma, it is critical that the dense phases not coalesce (immiscible sulfides) or agglomerate (fine chromite) during transport, which would increase the bulk density of that part of the system and lead to backflow. Semi-massive inclusion-rich dike-hosted ores at Sudbury and Voisey's Bay may therefore represent backflow, but may also represent seismic-driven vertical slug flow. More detailed geometrical studies will be required to distinguish between these possibilities. Inclusion-poor stratiform-stratabound sulfide and chromite mineralization exhibit none of these features and are more likely to have formed *in situ*. **(*SS9; Wed. 1:40*)**

Mining a till geochemical database for new mineral prospects in British Columbia

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The British Columbia Geological Survey till geochemistry data compilation can be a valuable aid to mineral exploration given that glaciogenic sediments cover much of the province and that basal till geochemistry has a proven ability to detect buried mineralized bedrock. First published in 2008 this database now has information for over 8000 mainly basal till samples collected by the British Columbia Geological Survey, the Geological Survey of Canada and Geoscience BC. Sample attributes in the database include location coordinates, information about bedrock geology beneath the sample site and the surficial sediment type. Most of the till samples have geochemical data from the analysis of a 0.063 mm size fraction for major, minor and trace elements by a combination of instrumental neutron activation, aqua regia digestion – inductively coupled plasma emission or mass spectroscopy, lithium metaborate fusion - inductively coupled plasma emission spectroscopy and loss on ignition. A smaller number of the till samples also have gold grain abundances and gold grain shapes in a heavy mineral concentrate and the results of a clay size (0.002mm) fraction analysed for trace elements including gold.

Statistical analysis of the data and filtering different element combinations can reveal distinct till geochemical signatures that could reflect concealed mineralized or altered bedrock. For example, over one hundred till samples have anomalous gold-copper-arsenic-molybdenum values including several from near the Huckleberry and Mount Milligan porphyry copper-gold deposits. While major oxides alone do not seem to show evidence of bedrock contacts, a ratio of aqua regia extractable potassium oxide to total potassium oxide in till samples can highlight the potassium alteration associated with known porphyry deposits. Hence, a comparison of the geochemical data generated by different analytical methods can reveal much more than just element variations in till and increase the size of a detectable hydrothermal alteration envelope. **(*GS6; Wed. 9:00*)**

Preliminary 3D modelling and structural interpretation of the southeastern Athabasca basin

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The southeastern part of the Athabasca basin hosts some of the largest high-grade unconformity-related uranium deposits in the world, including McArthur River and Key Lake. As a first step of an effort to reconstruct and model the fluid flow related to uranium mineralization, a 3D model of the sub-Athabasca unconformity and basin stratigraphy has been constructed using drill-hole log data. Several cross-sections have been built and integrated into the 3D model to constrain the spatial configuration of Athabasca Group units. Faults have been identified using an iterative approach first identifying potential fault lineaments using the basement geophysical signature, and then checking if these linear features have any spatial relationship to offsets of the unconformity surface. Using this approach, two dominant sets of faults, inferred to be near vertical, have been identified in the area of study: one trending approximately NE and the other NW. The unconformity surface in the 3D model shows an approximately NE-trending zone of elevated topography with elevations changing from about -100 m to 400 m. This topographic ridge of the unconformity is associated with the Wheeler River (Phoenix)/McArthur River deposits trend. A preliminary cross-section illustrates that this may be controlled by NE-trending reverse faults that have uplifted the basement. Regional clay anomalies in the Athabasca Group are broadly coincident with the topographic highs of the unconformity surface. Draping of the major uranium deposits, prospects and occurrences onto the unconformity surface indicates that the majority of deposits and prospects are located where these structures appear to have offset the unconformity. Future work will be focussed on increasing resolution of the model in this and other key areas to gain a better understanding of the geometry and kinematics of regional and local structures and their control on fluid flow and mineralization. **(*SS5; Fri. 9:00*)**

Recent research on indium from The Lagoa Salgada orebody, Iberian Pyrite Belt, Portugal

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The Iberian Pyrite Belt is one of the most outstanding European ore province, hosting one of the largest concentrations of massive sulphides in the Earth's Crust. Lagoa Salgada orebody, the most northerly of the Iberian Pyrite Belt known so far, is a small massive sulphide deposit with an inferred mineral resource of 3.7 Mt. The orebody has been described as composed of a central stockwork zone – a thick Volcano Sedimentary Complex with more than 700m – and a massive sulphide lens in the northwest. It is covered by more than one hundred meters beneath sediments of the Sado Tertiary basin.

A Junior Exploration Company has implemented an exploration program with recent drilling holes in new areas of the northwest lens of the deposit. Different types of ores have been identified on preliminary metallographic study that have established five basic textural domains: (i) Massif pyrite; (ii) Banded texture with layers of sphalerite and, rarely, of sphalerite and galena; (iii) Secondary transformation of massif pyrite; (iv) Infilling veins texture; (v) Supergenic banded texture.

The ore mineralization assemblage is mainly composed of pyrite with minor sphalerite, tetrahedrite-tennantite, arsenopyrite, chalcopyrite, galena, stannite, cassiterite, and supergene minerals which are in different amounts represented throughout the basic textural domains.

Polished sections of massive sulphide ore samples were studied by Electron-probe microanalyses (EMPA). Most of the minerals phase are behind the detection limit of Indium values, however, related with banded basic textural domain (ii) it was identified one generation of sphalerite, with mean granular dimension of 20 micra included on recrystallized arsenopyrite, that have 23000 ppm of Indium. This value is four times more Indium content than the best average values of other studied sphalerite examples on the same orebody deposit, in recent published results. This discovery proves again the complexity of this deposit and highlights the needed of prospecting new areas inside the ore body with predominance of this generation of sphalerite.

Ongoing works will demonstrate the Lagoa Salgada orebody potential for this rare trace metal, that is used in high-tech applications and is critical for European Industry. **(*SS7; Wed. Poster*)**

Young-Davidson and Hemlo gold deposits in the Superior Province, Ontario: Contrasting styles of mineralization of common tectonic origin?

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Young-Davidson and Hemlo gold deposits occur in the Abitibi-Wawa Subprovince of the Superior Province. The Young-Davidson deposit is an intrusion-related lode-gold deposit that at least in part is structurally