

33rd IGC
International Geological Congress
6-14 August
Oslo 2008

Report: Metallogeny of the Arctic Region

As a contribution to the International Polar Year (IPY), and sponsored by International Association on the Genesis of Ore Deposits (IAGOD), there was held a special symposium on Metallogeny of the Arctic Region at the 33rd International Geological Congress in Oslo, Norway, 6-14 August 2008 (Session AAA-11).

Invitations were sent to researchers to submit papers to the following topics:

- Mineral and ore resources in the Arctic Region
- Mineral and ore geology in the Arctic Region
- Exploration and exploitation of ore and mineral resources in the Arctic Region
- Environmental aspects of ore and mineral resources in the Arctic Region
- Mining and mining challenges in the Arctic Region
- Metallogenic regions in the Arctic Region
- Metallogenic models in the Arctic Region

Invitations were spread to numerous researchers.

Conveners:

Tom V. Segalstad

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Ingar F. Walder

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Session AAA-11 program Friday 8 August 2008:

1 introduction, 6 oral presentations, 1 discussion, 1 poster, 3 no-show posters:

- 0830 Metallogeny of the Arctic Region - Introduction by Tom V. Segalstad [convener] (15 min.)
- 0845 Keynote Speaker, Warren J. Nokleberg et al.: Metallogenic and Tectonic Model for the Circum-North Pacific (30 min.)
- 0915 Keynote Speaker, Warren J. Nokleberg et al.: Tectonic and Metallogenic Evolution of Northeast Asia (30 min.)
- 0945 Poster oral presentations (15 minutes total):
- 0945 Alexander Smelov et al.: Geological and geochemical data for the gold-bearing mafic granulites of the Aldan Shield (Northeast Asia, Russia)
- 0948 Alexander Smelov et al.: Metallogeny of Precambrian gold in the Anabar Shield (Russia, Arctic Region)
- 0951 Alexander Malov: Diamondiferous kimberlites of the East European Platform: Specific Features
- 0954 Tom V. Segalstad, Ingar F. Walder & Steinar Nilssen (Ingar F. Walder presenting): Mining mitigation in Norway: Future Improvement Possibilities

- 1000 Coffee break (30 min.)
- 1030 Nigel Cook & Torfinn Kjærnet: Mineralogy and Paragenesis of Selected Base Metal Deposits, NW Spitsbergen, Svalbard (15 min.)
- 1045 Tom V. Segalstad, Krister Sundblad & Torfinn Kjærnet: Metallogeny of Pb-Zn-Ba Vein Mineralizations in Svalbard, Norwegian Arctic (15 min.)
- 1100 Tom V. Segalstad, Hans-Jørgen Berg & Lasse Telstø: Metallogeny of the Kolsvik Gold Deposit at Bindalen, Northern Norway (15 min)
- 1115 Tom V. Segalstad: Thermochemical Modelling of the Kongsberg Silver Ore Deposit, Norway (15 min.)
- 1130 Metallogeny of the Arctic Region - Discussion and Summary by Ingar F. Walder [convener] (30 min.)

Results: The introduction to the session by Tom V. Segalstad was not included in the official 33IGC program booklet. The introduction was being announced in different ways during the first days of the congress, and 16 people showed up for the introduction. The introduction discussed the extent of “The Arctic Region”, defined “metallogeny”, referred the contents of the invitation to the session, and briefly overviewed the contributions of the session.

The invited speaker Warren J. Nokleberg gave two extraordinary presentations on a metallogenic and tectonic model for the Circum-North Pacific (26 present) and on the tectonic and metallogenic evolution of Northeast Asia (30 present). These talk were accompanied with stunning animations on how the two regions had evolved through geologic time.

15 minutes had been assigned for short (3 minute) presentations of the posters. The 3 posters by the Russian authors were not presented as posters and did not show up for the oral presentations. This was a pity, because the titles and abstracts were interesting, and would have supplemented the other presentations of the session. The one remaining poster had a good turnout in the poster room. And the poster was also presented orally by Ingar F. Walder (~30 present).

After the coffee break Nigel Cook presented new data on the mineralogy and paragenesis of selected base metal deposits on NW Spitsbergen, Svalbard (29 present).

Tom V. Segalstad presented, based on field data, stable isotope data and lead isotope data, a talk on the metallogeny of Pb-Zn-Ba vein mineralizations in Svalbard, Norwegian Arctic (30 present).

Tom V. Segalstad continued by presenting a talk on the metallogeny of the Kolsvik gold deposit at Bindalen, Northern Norway (30 present).

And Tom V. Segalstad further presented a talk on thermochemical modelling of the Kongsberg silver ore deposit, Norway (30 present).

The session ended with a discussion and summary of the session, led by Ingar F. Walder (~30 present). A number of questions had accumulated during the course of the session, and there was ample time for discussions. The questions arose on details in Nokleberg’s tectonic reconstructions, and on the possible metallogenic importance of the Jurassic / Cretaceous large igneous intrusions in the Arctic. This discussion session made it possible to go deeper into the subject-matter presented by the speakers, and to discuss matters not treated by the speakers.

It is obvious that it is not possible to cover all of the metallogeny related topics in this relatively small session at 33rd IGC. The presence of our Russian colleagues would have broadened our coverage. Russian geologists present in the audience, however, helped filling this gap. The presentations of the session covered anyhow a wide geographic area and a wide methodological area. Geographically the presentations of the session covered North-East Asia, Alaska, North-West Canada, Svalbard, and Norway. Other contributions from Russia did not materialize. Methodologically the session covered regional geology, plate tectonics, historic geology, ore

microscopy, scanning electron microscopy, mineral paragenesis, radiogenic isotope geochemistry, stable isotope geochemistry, fluid inclusion thermo-barometry, thermochemical (thermodynamic-chemical) modelling, and mining mitigations aimed at tailings and ground water contamination from previous mining operations.

The different sessions on the geology of the Arctic Region gathered a number of people with thorough knowledge in, and interest for, the geology of this region. It was important and highly relevant to have a separate session on the Metallogeny of the Arctic Region. Some of the people attending this session had other major interests within the geology of the Arctic Region, and felt it was important to be present, in order to learn about the metallogeny of this region.

Thanks to IAGOD for suggesting and sponsoring this session on Metallogeny of the Arctic Region.

Tom V. Segalstad

APPENDIX:

Metallogeny of the Arctic Region

Metallogeny (metallogenesis) is the study of the genesis of mineral deposits, with emphasis on their relationship in space and time to regional petrographic and tectonic features of the Earth's crust. The term is used for both metallic and nonmetallic mineral deposits. Metallogenic province is an area characterized by a particular assemblage of mineral deposits, or by one or more characteristic types of mineralization. (Definitions from Neuendorf, Mehl & Jackson, Eds., 2005: Glossary of Geology, 5th Ed. American Geological Institute, Alexandria, VA, 779 pp.)

The Arctic Region may be defined in different ways. This section's conveners will not stick to a strict definition of the Arctic when selecting contributions to this section, in that topics related to the metallogeny of both the Arctic and the Sub-Arctic regions will be considered relevant under the "Arctic" sensu lato (= in the broad sense) designation.

The Arctic region may be characterized by covered by ice and snow, permafrost, small population, protection by law, environmental rules, limited access, dangerous polar bears, and therefore poorly known geology. Anyhow, both metallic and nonmetallic mineral deposits are known, and mining occurs and have occurred, in the Arctic.

The metallogeny of a significant part of the Arctic Region has recently been described by Warren J. Nokleberg et al. (2005: Metallogenesis and tectonics of the Russian Far East, Alaska, and the Canadian Cordillera. USGS Prof. Pap. 1697, 397 pp). The conveners wish that this standard work should serve as a basis for the goals of this section, to cover all of the Arctic Region, thereby reaching a better understanding on how mineral deposits formed in this relatively unacquainted region.

Lectures and posters are invited on mineral and ore resources, mineral and ore geology, exploration and exploitation, environmental aspects, mining and mining challenges, metallogenic regions, and metallogenic models of the Arctic Region.

Conveners:

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