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G A C Newfoundland Section Spring Meeting

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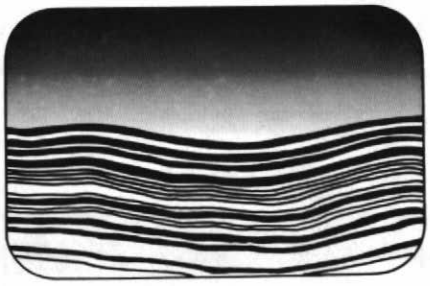
Conference Reports



Sediments and Stratabound Economic Minerals

GAC Newfoundland Section Spring Meeting

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The Spring Meeting of the Newfoundland Section of the GAC held in St. John's from April 1st to 3rd highlighted the subject of 'Sediments and Stratabound Economic Minerals', with special reference to Atlantic Canada.

The gathering had an international flavour with guest speakers from as far afield as Scotland and New Mexico. Overall attendance was excellent with the wide range of industrial interest reflecting the topical nature of the meeting. It was perhaps apt that the technical sessions were held in the conference room of the new Queen Elizabeth II Library at Memorial University.

The technical program was divided into several sections dealing with familiar mineral deposit types e.g. sandstone-hosted uranium deposits, shale-hosted Pb-Zn deposits and so on. In addition, several speakers were faced with the unenviable task of providing broad reviews of the tectonic, geochemical and metallogenetic controls of ores in sediments.

All of the talks were of high quality and they ranged in perspective and scope from an assessment of the geochemical evolution of seawater through time and its effect on the metal content of black shales by Heinrich Holland (Harvard University) to an assortment of detailed studies of ore genesis in individual deposits such as the Yava Mine in Nova Scotia (Oliver Bonham, Dalhousie University).

In the opening lecture Mike Russell (University of Strathclyde) set the tone of the meeting by providing a comprehensive overview of sedimentary ore deposits in the Caledonian metallogenetic province. In a most eloquent and stimulating fashion Russell presented detailed accounts of ore deposits such as those at Aberfeldy (Ba-Pb-Zn) in Scotland and Silvermines (Ba-Pb-Zn) in Ireland, and integrated their development on a regional scale with the operation of downward-excavating hydrothermal cells produced in areas of incipient rifting (cf. Russell *et al.*, 1981).

The onset of tension allows the downward penetration of seawater into the sedimentary pile and the leaching and mobilization of elements such as Ba, Si, Pb, Zn and Cu. Russell stressed the importance of rock permeability as the major control of the development of the hydrothermal fluid systems. Typical vertical dimensions for such systems are 5 km to 7 km. Productive hydrothermal cells are of the order of 18 km in diameter and Russell suggested that ore-body spacing closely mimics this cell dimension.

One of the most fascinating aspects of Russell's work has been the recognition of pyrite chimneys at the Silvermines deposit (Figure 1). These beautifully preserved hydrothermal vents appear to be analogous to the 'black smokers' recently identified along the East Pacific Rise.

In an equally illuminating presentation Brian Fryer (Memorial University) provided a lucid account of the generation of Precambrian banded iron formations,

Figure 1 *Pyrite chimney from Silvermines Ba-Pb-Zn deposit (courtesy of Mike Russell, University of Strathclyde).*

with special reference to the Sokoman iron formation in Labrador. Fryer presented some convincing, although as yet unpublished, rare earth element data supporting the hypothesis that hydrothermal efflux along ocean ridges provided an important contribution to BIF genesis.

Dave Strong (Memorial University) reviewed the geology of the important new discoveries at Roxby Downs, South Australia (Cu-U-Au) and Rouez, France (Fe-Cu-Pb-Zn-Ag). Both deposits contain greater than 10^8 tonnes of ore and are hosted by sediments of late Precambrian age. Strong described the spatial relationship of the deposits to the margin of the Gondwanaland supercontinent and speculated upon the existence of similar occurrences within the late Precambrian Conception Group of the Avalon Penninsula.

Heinrich Holland (Harvard University) presented two lectures in his capacity as the Society of Economic Geologists' Thayer Lindsley Distinguished Lecturer. Both concerned the geochemical evolution of seawater through time. Of particular interest was his discussion of the distribution of metals in black shales and his conclusion that this distribution mimics that in contemporaneous seawater, with the concentration of metals in seawater having remained relatively constant (within a factor of 2 to 3) over the last 2.5 Ga.

In one of the more detailed geological "exposés" of individual mineral deposits, Tom Lane (Teck Corp.) provided a beautifully illustrated description of the Daniel's Harbour Zn ore-body in western Newfoundland. The Zn ore is hosted by Cambro-Ordovician carbonate breccias and the quality of the field and petrological work carried out by the Teck staff is evidenced by the recent additions to Teck's ore reserves.

Hailing from a slightly warmer climate Gene Saucier (Sedi Met. Inc.) withstood the "rigours" of the Newfoundland Spring weather to present a review of the uranium mineralization in the Grants Mineral Belt of New Mexico. This 160 km long metallogenetic feature is responsible for approximately 50% of the uranium production and reserves of the U.S. Uranium mineralization is intimately associated with organic matter in deposits of two distinct ages. A Late Jurassic phase of mineralization is hosted by arkoses of fluviatile origin intercalated with devitrified felsic ash units, which are interpreted as the source for uranium. These early "trend-type" deposits are typically flat, tabular and stratiform with their long dimensions occurring parallel to the sediment transport direction. They are thought to have formed fairly rapidly after sedimentation. Typical ore grades are of the order of 0.2% U_3O_8 with coffinite as the most common ore mineral. A later Tertiary oxidation of the trend-type orebodies then produced massive remobilization of uranium and the formation of second-generation "roll-front" deposits.

In keeping with the traditions of the many previous gatherings organized by the Newfoundland Section of the GAC, the 1982 Spring Meeting provided a combination of good science and goodwill. The insight and industry of the organizing committee is self-evident from the quality of the technical program. All of the participants would, I am sure, be happy to join together in extending a vote of thanks to Art King (President), Rick Hiscott (Program Chairman), Charlie Gower (Secretary-Treasurer) and Norm Mercer (Publicity Chairman) for their efforts on our behalf.

Reference

Russell, M.J., M. Solomon, and J.L. Walshe, 1981. The Genesis of sediment-hosted, exhalative zinc + lead deposits: Min. Deposita, v. 16, p. 113-128.

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