Biography - Stephen M. Rowins

Dr. Stephen M. Rowins is the Chief Geologist and Executive Director of the British Columbia Geological Survey. He also serves as an Adjunct Professor in the School of Earth and Ocean Sciences at the University of Victoria where he teaches economic geology. He holds a doctorate in Geology from UWA (1994) and was a NSERC Post-Doctoral Fellow at McGill University in Canada. In 1996 he joined Westmin Resources Limited (subsequently Boliden Limited) as an Exploration Project Geologist with a focus on the Americas. In 1999, Rowins became an Assistant Professor in the Department of Earth and Ocean Sciences at the University of British Columbia and carried out both fundamental and exploration-related research in collaboration with various mining companies. He returned to industry in 2006 and served as the Vice-President of Exploration for Northern Abitibi Mining Corp., which was awarded the 2010 Prospector/Explorer of the Year Award by the Canadian Institute of Mining and Metallurgy (Newfoundland Branch) for the discovery and delineation of the Viking gold deposit. Since 2011, Rowins has led the British Columbia Geological Survey and his research has focussed on developing indicator minerals to explore for covered mineral deposits and investigating metal endowments in magmatic arcs. In 2016, he co-authored the paper that won the Brian J. Skinner Award for the “best paper” in the journal *Economic Geology*. He is a Past President of the Geological Association of Canada and is currently a board member of the Canadian Mining Innovation Council (Footprints Project).

A novel approach using detrital apatite and till geochemistry to identify buried orogenic gold deposits in central British Columbia

Stephen M. Rowins

British Columbia Geological Survey, 1810 Blanshard Street, Victoria, BC, V8W9N3, Canada

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School of Earth and Ocean Sciences, University of Victoria, 3800 Finnerty Road, Victoria, BC, V8P5C2, Canada

Email: stephen.rowins@gov.bc.ca

Recent studies (Mao et al., 2016) demonstrate that apatites from carbonatites, unmineralized rocks and different deposit-types have distinct trace element compositions that are readily discriminated by linear discriminant functions using Mg, V, Mn, Sr, Y, La, Ce, Eu, Dy, Tb, Pb, Th and U. Step-wise discrimination diagrams permit the subdivision of apatites by origin. This apatite discriminant approach has been tested on 10 separate areas in the glaciated and underexplored Nechako Plateau of central British Columbia. A subset of 40 mineral concentrates were selected from a larger group of 609 basal till mineral concentrate samples (10-12 kg) collected as part of the regional "Targeting Resources for Exploration and Knowledge" (TREK) project. Picked apatite grains (n=459) were subsequently mounted in epoxy and polished for EPMA and LA-ICP-MS analysis. To aid in the interpretation of these apatite data, we also used till geochemistry from smaller basal till samples (2-3kg) that were collected at the site of each of the mineral concentrate samples, plus those collected elsewhere within the TREK project area (n=650), and archived basal till sample pulps (n=1456). A total of 342 apatite grains (344 analyses) were classified as associated with mineralization with 26 grains sourced from orogenic Au systems. Although there are no confirmed orogenic Au deposits in the TREK area of the Nechako Plateau, past-producing orogenic Au mines at Bralorne-Pioneer and Cassiar-Erickson attest to the prospectivity of the Cenozoic and Mesozoic arc rocks underlying the Nechako Plateau. Orogenic Au deposits have veins hosted in major faults and shear zones in association with variable enrichments in Au, Ag, As, Te, W, B, Bi and, in shallower (epizonal) systems, Sb and Hg. In this study, some orogenic Au apatites are in tills down-ice of purported epithermal Au-Ag showings (e.g., April, Blackwater, and 3Ts). This suggests that these Au-Ag veins could be misclassified epizonal orogenic Au (Ag) veins. Other till samples with orogenic Au apatites are spatially associated with prominent faults and splays (QFP and Hallett Lake), contain abundant detrital gold grains (Saunders), and possess strong Au, Ag, and Te anomalies (Tagai and Sinkut Mountain). Together, these geological data provide strong evidence that orogenic Au mineralization exits under glacial sediment in those study areas. The apatite discriminant method appears to work well for orogenic Au systems on the Nechako Plateau and further application of the technique is warranted.