

GAC CORDILLERAN SECTION

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Gold Talk!

Friday June 5, 2015, 11:00 am

Discovery Center, Geological Survey of Canada
1500 - 605 Robson Street, Vancouver, BC

Admission is free - Space is limited – seating is on a first come – first seated basis

Synorogenic gold mineralization in granite-greenstone terranes: the deep connection between extension, major faults, synorogenic clastic basins, magmatism, thrust inversion, and long-term preservation.

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ABSTRACT

Structurally controlled “lode gold” systems within or in proximity to major fault zones (colloquially known as “breaks”) represent a dominant deposit type in Canada, particularly in the Archean cratons of the Canadian Shield. In this presentation I will describe some of the critical characteristics of these deposits, specifically their relationship to the major faults and the complicated kinematic history of these faults, and to the panels of synorogenic clastic (\pm volcanic) rocks that occur along these faults. The synthesis that emerges is mainly based on the Timmins area, Canada’s most prolific gold camp, but critical elements apply equally to and have been ground-truthed in other gold camps, i.e., Kirkland Lake, the Abitibi more generally, the Rice Lake belt, Yellowknife, and the Agnew camp of the Yilgarn craton. In all of these areas, the key faults cut early fold-and-thrust structures and were likely initiated as crustal-scale, synorogenic extensional faults in association with a flare-up in synorogenic, typically more alkaline magmatism. Extension, the associated mantle-derived magmatism, and the resulting thermal pulse into the lower crust were likely the ultimate drivers of the gold mineralizing events. Synorogenic extension also minimized post-orogenic uplift, thus playing an important indirect role in preservation of the upper crustal depositional environments. Following synorogenic extension and the initiation of the magmatic and hydrothermal processes that produced the gold systems, the crustal-scale faults were invariably inverted as thick-skinned thrusts, burying synorogenic basin remnants and gold deposits in their structural footwall, while deposits were removed or largely eroded from the structural hanging wall of these thrusts. This thrust inversion thus plays a critical role in the preservation of the gold endowment and explains the fundamental asymmetry across most of these camps. Gold mineralization appears to have peaked during the thrust-inversion stage and subsequent shortening, but had waned prior to final strike-slip overprinting of the fault zones. The integrated model provides a coherent guide for identifying and analyzing similar settings in more remote settings of northern Canada.