Abstract ID: 236

Title: GEODYNAMIC SETTING OF NORTH AMERICAN METALLOGENIC PROVINCES

Student: No

Topic: Economic Geology

Medium: Invited Oral Presentation

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Keywords: North America; metallogeny; plate tectonics; geodynamics

Abstract: Metallogenic provinces are the product of the interplay of plume and plate tectonics within the larger framework of the supercontinent cycle, and subsequent preservation potential. Prior to assembly of the supercontinent Ur at ~ 2.7 Ga, via accretionary, Cordilleran-type orogens, a Cu-Zn-Pb VMS province, including Kidd Creek, formed in the Abitibi intraoceanic back-arc. During accretion, cumulative 5000 tonnes Au were deposited along the terrane boundaries. Preservation of these Archean deposits stems from the ~ 300-km-thick refractory continental mantle lithosphere (CLM).

In the 1.8 Ga Trans-Hudson orogen (THO), VMS deposits formed in oceanic back-arcs, such as Flin Flon, and the giant Homestake Au deposit in accretionary sectors. The second supercontinent, Columbia, was amalgamated at ~ 1.8 Ga. The Athabasca is a foreland basin to the THO; unconformity U deposits developed proximal to unconformities in Saskatchewan. Major plume events at ~ 1.9 Ga and 1.1 Ga induced norite melts in CLM, which host magmatic Ni-Cu deposits in the circum-Superior craton, such as Sudbury, the Muscox and Duluth counterparts, and the Coppermine and Keweenawan Cu provinces. During rifting of Columbia in the Mesoproterozoic, Fe oxide, Cu, Au, and REE deposits were associated with A-type granites, and the Sullivan Pb-Zn deposit with a sill-sediment complex of an intracontinental rift.

Amalgamation of Pangea included middle to late Paleozoic formation of MVT deposits in extensional domains of the North American mid-continent orogenic foreland and orogenic gold deposits to the east of the craton margin. Late Paleozoic to Middle Jurassic Pacific margin SEDEX, VMS, and pre-accretionary porphyry deposits formed in the platform/shelf environment of the miogeocline or in oceanic arcs and continental

fragments in the Pacific basin. Jurassic onset of Cordilleran orogenesis, a function of North America-Pacific/Farallon/Kula plate interaction, led to a period between 185-50 Ma of widespread orogenic gold and porphyry formation within the active continental margin. Laramide subduction of the Juan de Fuca plate beneath western North American continental crust generated magmatism and formation of porphyry deposits and related epithermal systems. Incipient Eocene extension reopened favorably oriented older structures that facilitated formation of northern Nevada Carlin-type gold deposits. Yet, potentially critical to deposit formation was Mesoproterozoic to early Paleozoic rifting of Laurentia and related deposition of ideal miogeoclinal host rocks, further structurally prepared during Paleozoic and Mesozoic compressional orogenies.