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# GENESIS OF Au, Sb, AND Hg DEPOSITS IN ACCRETED TERRANES OF THE CANADIAN CORDILLERA

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Examination of the distribution of Hg, Sb and mesothermal Au deposits of the Canadian Cordillera reveals a pronounced association of these deposits with transcurrent faults. Some of the best examples of this association are Au deposits of the Coquihalla and Juneau districts, as well as Hg and Sb deposits associated with the Pinchi and Yalakom fault zones. Stable isotope studies indicate average $\delta^{18}O$ values of qtz of 17.5±1.0°/₀₀ (Au-qtz veins), 21.0±1.0°/₀₀ (Sb-qtz veins) and 29.0±2.0°/₀₀ (Hg deposits). Using temperatures derived from fluid inclusion and stable isotope studies, the $\delta^{18}O$ of the ore-forming fluids were calculated to be 9.5±1.5°/₀₀ (Au deposits), 10.0±1.0°/₀₀ (Sb deposits) and 8.0±2.0°/₀₀ (Hg deposits). H/D studies indicate that at all sites studied, the ore forming fluid was composed of meteoric water which had undergone substantial $^{18}O$ enrichment. The results of the isotopic studies, along with the similarities in structural and geologic settings, strongly suggest that a genetic link exists between the three styles of mineralization and furthermore, a zoning sequence exists ranging from high T and high P (~1 kbar) Au deposits to intermediate T, Sb deposits to low T, near surface Hg deposits. The deposits are believed to have originated via the deep circulation of meteoric water during transcurrent faulting. During the infiltration of fluid, the fluids evolved isotopically and chemically. Upflow of fluid occurred in zones adjoining the transcurrent faults. Deposition of Au-qtz veins occurred at depths >4 km and was the result of the combined effects of cooling, $CO_2$ effervescence, and the removal of sulfur from the system. At shallow levels Sb-qtz±Au veins were precipitated from the fluid and, as the fluid neared the surface, Hg±Sb was deposited in preexisting open spaces in fault breccias.

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