NSERC-CMIC FOOTPRINTS

Taylor CE, Ross M, Perrouty S, Lypaczewski P, Rivard B, Clark JR, Linnen RL, Olivo GR, Taves R, 2018, Defining the glacial dispersion of the Canadian Malartic stockwork-disseminated Au deposit through hyperspectral imaging analysis of surficial clasts, Abstract, PDAC-SMC, Toronto, ON

New prospecting techniques are in demand in exploration for near-surface, low-grade, high-tonnage gold deposits, especially in terrains that are covered by glacial regolith. Prospectors face numerous challenges, such as possibly imperceptible geophysical signatures, finer grain sizes of indicator minerals in surficial deposits than those typically analyzed, and signal obscuration from other nearby deposits within gold belts. Instead of using geochemistry on glacial sediment fine matrix or its sand-sized indicator minerals, we develop a new drift prospecting technique that focuses on larger clasts and evaluate its applicability to trace the detrital dispersion of altered - yet resistant - rocks down-ice from the Canadian Malartic stockwork-disseminated Au deposit. This new approach uses hyperspectral imaging analysis, which has been previously shown to effectively trace gold-related hydrothermal alteration in micas, i.e., an alteration footprint that is considerably larger than the regions of gold mineralization. We demonstrate the first use of hyperspectral imaging analysis on glacial clasts by analyzing dry sieved and washed 2-4 mm and 4-8 mm clasts from 57 till samples, and look for glacially transported clasts containing the characteristics of this footprint, potentially enlarging the target area for prospectors. The hydrothermal mica alteration of the Canadian Malartic deposit bedrock footprint is approximately 13 km² and is characterized by phengitic white mica (2205-2215 nm) and Mg-rich biotite (2241-2252 nm). Our results show both phengitic white mica and Mg-rich biotite present in glacial clasts in surficial sediments, and the dispersion of these altered clasts reveals broad secondary footprints in the down-ice direction of the Canadian Malartic deposit. The detrital alteration footprint for the 2-4 mm and the 4-8 mm clasts is approximately 50 km² and 70 km², respectively. Petrographic analyses are being performed to further investigate the provenance of these glacially dispersed clasts. The conclusion is that drift prospecting techniques may be highly applicable to near-surface, low-grade, high-tonnage gold deposits. When combined with the straightforward, economical, and rapid technique of hyperspectral imaging analysis, they may present a powerful approach to mineral exploration in glaciated terrains.

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