NSERC-CMIC
FOOTPRINTS

Lee RG, NSERC-CMIC Footprint Team, 2019, 'Footprints' and vectors of large scale mineral deposits: identifying and integrating mineralogical, lithochemical, and geophysical features of mineralizing processes, Abstract, ProExplo, Lima, Peru

Exploration and targeting of potential large scale economic ore bodies in the future is becoming increasingly difficult as new discoveries are going deeper below the surface. Fluids released during the mineralization process extend both laterally and vertically away from the source and will alter the surrounding wall rock by varying degrees dependent on distance, rock type, and fluid composition. However, deposits that are covered by post-mineral material or the distal alteration features in the bedrock may be weak or difficult to interpret. New tools and methods are needed to identify these subtle expressions of distal alteration or 'footprints' that form during the mineralization process of economic deposits are essential for the future of exploration and mining. The Natural Sciences and Engineering Research Council of Canada (NSERC) and Canadian Mining Innovation Council (CMIC) put together a large multi-collaborative project to identify the 'footprint' of an ore system from the core to the margin and develop methods that integrate the various geological, structural, mineralogical, geochemical, petrophysical, and geophysical data sets that are collected during exploration for mineralization. Three sites were chosen to examine detailed petrologic, chemical, and geophysical responses that occur within and beyond the currently recognized 'footprint' of the ore system. The three sites included: Highland Valley Copper deposit, British Columbia; McArthur River - Millennium Basinal Uranium deposit, Saskatchewan; and the Canadian Malartic Disseminated Au Deposit, Ontario. New 'footprints' and vectors were identified for each deposit type based on multiple parameters from petrological to geophysical as well as new 3D constrained models that outline the regional geology and alteration features of the sites. The study provides new workflows and methodologies that can be used in an exploration program to vector towards buried or previously unrecognized ore deposits.

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