Perrouty S, Linnen RL, Olivo GR, and the Au-Site Team, 2018, Exploration footprint of the Canadian Malartic disseminated gold deposit, Abstract, Society of Economic Geology, Keystone, USA

Expanding the size of multi-parameter metasomatic footprints will benefit gold exploration by providing new vectoring tools for mineralized systems at depth. For this purpose, the NSERC-CMIC Mineral Exploration Footprints project (http://cmic-footprints.ca/) investigated the Canadian Malartic Archean gold deposit (> 18.6 Moz Au), located south of the Cadillac - Larder Lake Deformation Zone (CLLDZ), in the Pontiac Sub-province, QC, Canada. Low grade gold mineralization is early to syn-metamorphic peak (lower amphibolite facies), and is structurally controlled by the CLLDZ, by faulted contacts between intermediate-felsic intrusive and meta-sedimentary host rocks, and by high-strain structural corridors within fold hinges. Mafic dykes intruded all the Pontiac Sub-province during deformation and before the gold mineralizing event at Canadian Malartic. These three wall rock types reacted differently to the hydrothermal fluids, resulting in distinct structural, lithogeochemical, mineralogical, petrophysical and geophysical expressions of the deposit footprint. Volumetrically the mafic dykes are not significant, but they provide key features that characterize the distal alteration. The surficial dispersion of this footprint is also documented in the overlaying quaternary sediments (i.e., glacial till). Over one hundred variables define metasomatic haloes around the gold mineralized zones. The geometries of these haloes are both structurally and lithologically controlled along progressive metasomatic fronts from the core to the periphery of the mineralized system. Their sizes vary from less than 100 m to more than 6 km from the deposit. Integration of these multiple parameters highlights the geological processes associated with hydrothermal alteration or/and overprinting metamorphism, the petrophysical/geophysical responses of the altered mineralogy, and the glacial dispersion. This innovative and multidisciplinary approach to investigate large mineralized systems revealed various critical field and laboratory based parameters for footprint exploration around similar gold deposits elsewhere.

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