Canadian Malartic Geological Footprint: New insight from portable XRF data

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The Canadian Malartic gold mine is hosted mainly by metasedimentary rocks of the Pontiac Group, located on the south of the Cadillac – Larder Lake fault system, and by Piché Group mafic and ultramafic rocks. This world-class deposit contains over 14 Moz of gold (past production and current resources) and thus it is of interest to establish the size and characteristics of the footprint of the deposit. This is the aim of the CMIC-NSERC Exploration Footprint project, where multiple dataset (geological, mineralogical, geochemical, petrophysical and geophysical) will be integrated. Part of this study utilizes portable XRF (pXRF) to both evaluate the extent and character of the halo and to determine whether pXRF has sufficient precision and accuracy to be applied to characterizing the footprint. Over 1000 drill core sample pulps from plan and section views of the Malartic area were analyzed. Preliminary interpretation suggests some decreasing trends in Hg, Mo, Pb and K_2O contents, which correlate with Au previously analyzed by Osisko, from the mine toward south in the Pontiac meta-sediments. Some of the analyzed elements (e.g. SiO_2, TiO_2, Co, Cu) show distribution trends on a map view that may represent lithological variation within the Pontiac Group, rather than a hydrothermal overprint. By contrast, other elements such as K_2O are enriched in mineralized Pontiac metasediments, and values decrease away from the mineralization. K_2O values from pXRF also correlate well with gamma-ray data. Three kilometers south-west of the main deposit, the Bravo zone is a gold occurrence that was believed to be similar to the main deposit. However, pXRF data show that the Bravo zone mineralization contains significantly more arsenic, which suggests that the origin may be different. These examples show how pXRF can be very efficient and rapid technique to establish the geochemical composition and to recognize geochemical variation in the footprint of a deposit. CMIC-NSERC Exploration Footprints Network Contribution 009.