An evaluation of geochemistry in the Upper Beaver deposit of the Kirkland Lake area: Towards a new gold exploration model

K Feick[1], N Banerjee[1], M Masson[2], R Zalnieriunas[2]

[1]Earth Sciences Department, University of Western Ontario, London, Ontario; [2]Canadian Malartic Corporation, Upper Canada Mine Site, Dobie, Ontario

Canadian Malartic Corporation (CMC) currently maintains the largest land holdings package in the Kirkland Lake gold camp. Recent work on the property is focused on developing a structural, chemical, and rheological framework for fluid-rock interactions, deposition mechanisms, and mineralization across the property. The objective of this study is to assist in the development of a new exploration model for CMC's Upper Beaver project, a syenite-intrusion related deposit within the lode-gold dominated Kirkland Lake camp, by assessing trace element associations with gold mineralization to elucidate deposit formation and the source of the gold and to inform future exploration efforts. The project will utilize bulk-rock geochemical data acquired by CMC from drill hole and surface outcrop samples for their Upper Beaver deposit and surface sampling program to identify large-scale geochemical trends. Additional collected samples will undergo a combination of petrography, x-ray diffraction, scanning electron microscope, and synchrotron analysis to aid in determining trace element associations with gold. Ultimately the study aims to tie together mass amounts of bulk rock geochemical data with statistical and synchrotron analysis to distinguish spatial changes in trace element compositions and thereby providing a new framework for looking at fluid evolution, deposition mechanisms, and fluid-rock interactions, as well as providing novel trace element exploration vectors.