

Geochemical analysis of surface till in the Amaruq property: Preliminary results of a gold deposit affected by glacial processes

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The Amaruq deposit in Nunavut, owned by Agnico Eagle Mines Ltd, is in the Woodburn Lake greenstone belt, within the Rae Province of the Churchill craton. Mineralization is interpreted as a stratiform and vein-type iron formation-hosted gold deposit. There are three types of gold mineralization: (1) gold inclusions in arsenopyrite, (2) gold inclusions in pyrrhotite, and (3) free electrum in quartz-carbonate veins associated with base metal sulfides. During the Wisconsinan glaciation, the Amaruq deposit was eroded by the Laurentide Ice Sheet, which covered the Archaean basement with till and remolded the bedrock surface. Ribbed till, streamlined landforms and eskers shape the glacial landscape and indicate a predominant NNW regional ice flow. Amaruq is an ideal site to geochemically investigate the glacial dispersal of a gold deposit due to the deposits association with multiple glacial landforms, variable till thickness, lack of significant vegetation cover, and known mineralized structures that are oriented perpendicular to the regional ice flow. A detailed till sampling program (mesh 100x100m) was conducted in 2015 in an area north of the outcropping gold mineralization. A robust principal component analysis of the till geochemical dataset (<63µm, Aqua regia digestion, ICP-AES and -MS) was performed using the robCompositions R-package. Results show a strong gold association with silver, arsenic, cobalt, chrome, nickel, copper, antimony and tungsten in the first component (45% of the variance). Kriging of sample scores for the first component show NNW trending anomalies down-ice of the known mineralization site. In an area of thick till north of the Whale Tail zone, the deposit anomaly reaches the till surface approximately 1.5km from the outcropping mineralization site, which suggests that till thickness is an important factor to consider when interpreting variations in till composition.