

Glacial flow and associated surficial material analysis: the case of Amaruq, Nunavut

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The Amaruq project is located 60 km northwest of Agnico-Eagle's Meadowbank gold mine in the Baker Lake area, Nunavut. This study aims at bringing new insights into the glacial dispersal processes that affected this newly discovered gold deposit. Mapping of quaternary deposits was undertaken at two scales: regional (1:50,000) and detailed (1:10,000), covering 2,400 km² and 100 km², respectively, and both centered on currently known deposits. This work is done jointly with another study focused on the indicator mineral and till geochemical signatures of the deposits. Together, the two studies aim at increasing knowledge on glacio-sedimentary processes in periglacial environments, documenting the nature of surficial materials, and understanding the chronology and dynamics of local and regional ice flows. The outcome of this work is to improve drift prospecting methods for gold exploration in glaciated terrains underlain by permafrost. During the last glaciation, the Laurentide Ice Sheet covered the study area until the ice disappeared approximately 6,000-7,000 years ago. As a result, the area is extensively covered by various types of glacial deposits. The predominant surficial deposits are bouldery to sandy till veneers, commonly forming small ridges perpendicular to ice flow, thick silty till blankets in streamlined landforms or plains, and five glaciofluvial systems containing esker ridges, hummocks, diamictons, kames, and outwash plains. The study area is located about 100 km northwest of the last position of the Keewatin Ice Divide. Previous 1:250,000 mapping indicates a main north-northwest regional ice-flow direction. In the study area, four sets of ice-flow directions were recognized based on the detailed mapping of striations, grooves, and roches moutonnées. The oldest, oriented towards the NNW (N345°), is the dominant direction and is responsible for most of the glacial moulding of the landforms. The second and third sets are oriented at N325° and N308°, respectively, and did not have a significant influence on the orientation of the landforms. The fourth ice-flow direction is found only locally along glaciofluvial systems and indicate late ice flows towards esker ridges. The effects of this glacial flow history on till composition and glacial dispersal will be evaluated.