

Observations of the Mary River Group at Long Lake, northern Baffin Island, Nunavut: stratigraphy and structure of an Archean supracrustal sequence

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The Mary River Group (MRG) hosts Baffinland's Mary River iron ore deposit, and is one of the Archean greenstone belts found in the northern Rae Craton on Baffin Island. Bedrock mapping was completed at an area dubbed 'Long lake' in the Tuktularvik region, south of Pond Inlet, northern Baffin Island, Nunavut during July and August 2017. This mapping constitutes a part of an M.Sc. thesis project undertaken as part of the two-year northern Baffin mapping initiative supported by the Geological Survey of Canada Geo-mapping for Energy and Minerals (GEM-2) program. The field area is underlain by a felsic basement gneiss, a felsic plutonic unit, and an overlying supracrustal sequence of metamorphosed sedimentary and volcanic strata interpreted as the MRG. Here we present a new geological map and stratigraphic column for MRG at Long lake. The crust underlying the study area is highly strained; a penetratively developed foliation is characterized by a consistently south-plunging lineation. The sequence is folded and imbricated along faults oriented sub-parallel to layering in the MRG. Folding is interpreted to have locally overturned the crustal sequence, and the low angle faults repeat and thicken the MRG. Our observations challenge the previously suggested structural dome and keel model for the mineralized MRG rocks, and have implications for iron and gold mineralization across this greenstone belt.