

Lithogeochemistry and chemostratigraphy of the Hanson Lake Assemblage, west side of Hanson Lake, Saskatchewan

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The Paleoproterozoic Flin Flon Greenstone Belt (FFGB) extends from central Manitoba into east-central Saskatchewan. It is part of the Reindeer Zone of the Paleoproterozoic Trans-Hudson Orogen. The Hanson Lake Assemblage (HLA) comprises the western end of the FFGB, and is located near Hanson Lake, Saskatchewan, approximately 100 km west of Flin Flon Manitoba. To the south, it is unconformably covered by Phanerozoic sedimentary rocks. The HLA is host to a number of volcanic hosted massive sulphide Cu-Zn showings and prospects, including the McIlvenna Bay and Hanson Lake (Western Nuclear) deposits. Both of these deposits are covered (the Hanson Lake deposit by Hanson Lake, and the McIlvenna Bay deposit by Ordovician cover). Host lithologies for all of these VHMS occurrences are volcanic and volcanoclastic rocks. These are interbedded with subordinate clastic sedimentary rocks and silica/Fe-oxide exhalative horizons. Metamorphic conditions in the HLA reached upper greenschist to upper amphibolite facies, depending on location, and thus a 'meta' prefix is implied for rocks of the HLA. The host rocks to these mineral occurrences are generally not well understood, and a comprehensive stratigraphy for the exposed part of the HLA has never been constructed, largely due to complexities arising from thickness variations, changes in volcanic facies, and difficulties in rock identification due to hydrothermal alteration, deformation, and metamorphism. Nevertheless, many data sets from past mineral exploration and regional mapping surveys have provided an abundance of historical data from the area, consisting primarily of regional geological maps, drill core logs, and regional and drill core lithogeochemical datasets. As such, data exist that allow the construction of fully integrated lithostratigraphic and chemostratigraphic models for the HLA that can be used to correlate exposed stratigraphy north of the shield margin with rocks encountered in drill core beneath cover south of the unconformity. Molar element ratio (MER) analysis of new lithogeochemical data, collected from the western side of Hanson Lake and constrained by petrographic analysis, has provided important chemical constraints for the classification of host rocks located there, and has allowed the development of a stratigraphic model for that part of the stratigraphy. This dataset will serve as a foundation for the incorporation of other historical datasets, and the resulting stratigraphic model will assist explorationists prospecting for VHMS mineralization south of the unconformity.