

## Updated geology, geochemistry, and geochronology of Southern Indian Lake, Manitoba: contributing for a better understanding of architecture of the Trans-Hudson Orogen

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### Summary

The Southern Indian Lake area is part of the Southern Indian domain in Manitoba, thought to be a continuation of the Rottenstone domain in Saskatchewan. Together they are part of the Reindeer zone of the Trans-Hudson Orogen. Geological investigations in the Southern Indian Lake area have provided unique opportunities for a better understanding of the architecture of the Orogen in this area of Manitoba. The Southern Indian domain is mostly composed of variably migmatitic metasedimentary rocks, various granitoid units and rare belts dominated by metavolcanic rocks that recorded the development and closure of the Paleoproterozoic Manikewan Ocean between the Archean Hearne, Superior and Sask cratons, the development and accretion of intraoceanic volcanic arc complexes and associated basinal sedimentary sequences to the southern margin of the Hearne craton.

Previous work identified a window of ca. 2.5 Ga orthogneiss in the west central portion of Southern Indian Lake. These are the only known exposures of Sask craton-aged rocks in the area. It is possible that this corresponds to a relatively small, tectonically interleaved wedge of Archean to earliest Proterozoic crust. Alternatively, these exposures could represent part of an isolated fragment of Sask craton-aged crust within the Manikewan oceanic basin.

Recent geochronology results reveal an emplacement age of 1889 Ma for the Northern Indian Lake pluton in a calcalkalic volcanic-arc setting, which is comparable in terms of chemistry and age to VMS-associated felsic magmatism elsewhere in the Trans-Hudson Orogen, including the world-class Flin Flon, Snow Lake and Rusty Lake belts.

This work presents results from recent geological mapping in this area of the Trans-Hudson Orogen by both the Manitoba Geological Survey and the Geological Survey of Canada (within the Targeted Geoscience Initiative 3), including updated whole rock and trace element geochemical, isotopic, and geochronological data.