

The Origin of Granites in the Boothia Peninsula, Nunavut: Preliminary Insights into Precambrian tectonic regimes of the central Canadian Arctic

A Osinchuk¹, M Sanborn-Barrie², D Regis², T Chacko¹, LM Heaman¹, A Ford²

¹University of Alberta, Edmonton, AB, ²Geological Survey of Canada, Ottawa, ON

Presenting Researcher

Recent bedrock mapping on Boothia Peninsula, as part of Natural Resource Canada's GEM program, has revealed widespread lower granulite-facies biotite-garnet ± sillimanite semi-pelite and psammite that are in part migmatized with spatially associated garnet-cordierite-sillimanite leucogranite. The metasedimentary rocks are interfolded with a similarly metamorphosed strongly foliated S-type biotite-garnet monzogranite to granodiorite unit, characterized by alkali feldspar porphyroclasts. Preliminary U-Pb geochronology done with the SHRIMP at the GSC reveals that the metasedimentary rocks have a U-Pb zircon profile dominated by ca. 2.5 Ga detritus that bears strong similarity to the Sherman Group of the Queen Maud Block¹. The S-type porphyroclastic granitoid pluton however is older, with a ca. 2.561 Ga age that does not correlate with known plutonic ages for mainland ca. 2.45-2.52 Ga Queen Maud² granitoids to the southwest, nor the nearby ca. 2.58-2.61 Ga Rae plutonic events³ to the southeast. The implication of discovering the origin of this plutonic unit could potentially bridge the gap in our understanding of the tectonic relationship between the Rae craton and the Queen Maud Block during the Neoproterozoic.

While quartz diorite-leucogabbro cut metasedimentary sequences in the central and northwest part of the peninsula, southeast Boothia Peninsula is dominated by extensive weakly foliated to massive biotite ± hornblende ± orthopyroxene alkali feldspar granite and syenogranite plutons. Although the weak fabric is coincident with the general SW-striking regional fabric seen in eastern Boothia, the degree of strain is much lower, implying late stage emplacement in respect to regional deformation. Syenogranites furthest southeast potentially correlate to a ca. 1846 Ma pluton described by Ryan et al., 2009⁴, which may imply magmatic activity coeval with Trans-Hudson events. Investigation into the litho-chemical characteristics of these emplaced granitoid plutonic suites on Boothia Peninsula is the initial step to better understanding their

petrogenesis.

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- ³Hinchey, A.M., Davis, W.J., and Ryan, J.J. 2011. Neoproterozoic high-potassium granites of the Boothia mainland area, Rae domain, Churchill Province: U–Pb zircon and Sm–Nd whole rock isotopic constraints. *Canadian Journal of Earth Sciences*, 48: 247–279
- ⁴Ryan, J.J., Nadeau, L., Tremblay, T., Davis, W.J., Berman, R.G., James, D.T., Brouillette, P., 2009. *Geology and analytical results of the Boothia mainland area, Kitikmeot Region, Nunavut*. Geological Survey of Canada unpublished poster presentation Cordilleran Roundup 2009, Vancouver