

New isotopic neodymium data in the northeastern Superior Province, Nunavik, Québec

Charles Maurice¹

RP 2006-06(A)

Keywords: isotope, neodymium, model age, Archean, Superior Province

Abstract

The northeastern Superior Province is mainly comprised of Neoarchean (2.8-2.7 Ga) plutonic and volcanic rocks which contain preserved older crust fragments (2.9-3.8 Ga). In a regional reconnaissance work context, neodymium isotopes constitute a useful tool to define the extent of this older crust, calculate its age and measure its degree of interaction with younger magmatic rocks. Furthermore, this tool can be used to trace the chemical evolution of magmatic sources through time. In this study, results from 55 new isotopic analyses are combined with data from other works to produce a comprehensive compilation of 339 analyses covering almost the whole northeastern Superior Province.

Results from mafic and ultramafic rocks help to better define the chemical evolution of magmas from the mantle. Almost all mafic and ultramafic rocks younger than 2.75 Ga show enriched isotopic compositions, while the older ones would rather correspond to the evolution of the depleted mantle. This compositional change suggests that magmas from the mantle emplaced after 2.75 Ga have assimilated significant proportions of evolved continental crust. New results from felsic rocks contribute to define two distinctive terranes, the Rivière Arnaud Terrane and the Hudson Bay Terrane, and to emphasize the significant recycling of older crust.

1. Ministère des Ressources naturelles et de la Faune