New insights into the geological evolution of the Archean Norrbotten province, Fennoscandian shield

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The Archean Norrbotten province is exposed in northern Sweden and northwestern Finland (Råstojaure–Rommaeno and Muonio complexes) and isotopically traced subsurface south to the Luleå-Jokkmokk area (Mellqvist 1999). New age determination data suggest that ca. 3.2 Ga orthogneisses are found in the NW corner of the province, forming its oldest part. The major part of the Råstojaure–Rommaeno complex is composed of ca. 2.8-2.72 Ga orthogneisses and granitoids, with the ages generally being younger in the E part of the block near the contact of the Proterozoic greenstones. Leucogranites and pegmatite dikes with ages in the range of 2.7–2.6 Ga cross-cut the orthogneisses. Some 2.9–2.8 Ga greenstone belt and paragneiss fragments are found within the gneiss complex but contacts are commonly not observed due to limited outcrop. Proterozoic granitoids intrude the southern part of the Råstojaure–Rommaeno complex. On the eastern side of the Karesuando–Arjeplog shear zone and the Proterozoic greenstone belt that delimit the Råstojaure–Rommaeno complex the exposed Archean fragments of the Muonio complex show ages between 3.0 Ga and 2.7 Ga. Detrital zircon population in the lowermost Proterozoic quartzites (Palovaara fm/Tjärro quartzite) is solely Archean whereas the younger quartzites have large amounts of Proterozoic zircons. Nd isotope data may be used to delineate the extent of Archean crust outside the exposed blocks. Some ca. 1.78 Ga granitic pegmatites in the Karesuando area were derived from purely Archean source whereas the older, ca. 1.88 Ga granitoids show a more juvenile Nd isotope composition with mixed Archean–Proterozoic source similar to the Luleå area.

References:

Mellqvist, C. 1999. Proterozoic crustal growth along the Archaean continental margin in the Luleå and Jokkmokk areas, northern Sweden. Doctoral Thesis, Luleå University of Technology, 1999:24.