Geochronology and tectonic interpretation of the Nepewassi Domain, Central Gneiss Belt, Grenville Province, Ontario, Canada

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The Nepewassi domain is a parautochthonous unit within the Central Gneiss Belt of the Grenville Province. The aim of this study is to characterize the rocks in the Nepewassi domain, with the intention of testing the hypothesis that the parautochthon belt is the remnant of an inverted Paleoproterozoic passive margin. Igneous and detrital zircon U-Pb geochronology was completed using laser ablation – inductively coupled plasma – mass spectrometry at NGU in Trondheim. Tonalitic and granodioritic gneisses returned ages of 2673.2 ± 14 Ma and 2685.8 ± 4.8 Ma, similar to ages previously determined in the area, and nearby cratonic foreland. Detrital zircons in four quartzite samples were analyzed to determine the provenance of the sedimentary protolith. Three samples from a package of various metasupracrustal rocks lie along-strike within an east-dipping shear zone. The fourth quartzite sample is located a few kilometres across strike, at a higher structural level. All four samples have a detrital population peak at ca. 2.7 Ga, and two have a second peak at ca. 1.75 Ga. Zircon morphology suggests that, in a quartzite within the shear zone, the younger peak represents metamorphic rims; however in the structurally overlying quartzite, the younger peak represents a second detrital population. Metamorphic monazite from a metapelite, located within the same shear zone as three of the quartzite samples, was analyzed *in situ* using U-Th-Pb geochronology by electron probe at Dalhousie. The data show a large Grenvillian peak at ca. 990 Ma and a smaller, asymmetrical Paleoproterozoic peak with a dominant peak at ca. 1740 Ma and a subsidiary peak at ca. 1840 Ma. The combination of igneous, detrital, and metamorphic ages provides significant insight into the tectonic history of the rocks of the Nepewassi domain. We can now infer that Laurentian (Superior Province) cratonic basement rocks were the source of detritus in the metasedimentary rocks within the Nepewassi domain. Metamorphic and intrusive rocks formed ca. 1750 Ma may have been an additional source of sediment for the structurally higher and younger quartzite. The ca. 2.7 Ga detrital zircon population in the Nepewassi quartzite samples closely resembles metasedimentary formations in the Huronian Supergroup, which were deposited in a passive margin, on the southern edge of the Laurentian craton. Thus, these data support the hypothesis that sediments in the Nepewassi domain were also deposited on the edge of the Laurentian craton in a passive margin that was then inverted around or before ca. 1750 Ma during the Yavapai orogeny.

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