Utilizing Monazite Geochemistry and Geochronology to Constrain the Timing and Nature of Deformation and Metamorphism of Migmatitic Paragneisses from the Eastern Adirondacks, NY

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Current models for the tectonic evolution for the Adirondack Highlands include: the ca. 1200-1160 Ma Shawinigan Orogeny, intrusion of the ca. 1155 Ma AMCG suite, the ca. 1090-1050 Ma, and the < 1050 Ma phase of post-Ottawan orogenic collapse. This report applies field, petrologic and EMP monazite age techniques to a well-studied outcrop of garnet bearing gneisses along Hwy 4 near Comstock, NY in the Eastern Adirondacks in order to understand the geologic evolution of this outcrop in the context of current tectonic models. The outcrop exhibits well foliated, migmatitic, garnet-bearing paragneisses with quartzite layers in the upper sections. The matrix contains the mineral assemblage Grt+Bt+Kfs+Sil+Pl+Qtz while the stromatic leucosomes contain Grt+Kfs+Pl+Qtz. These observations are consistent with melting via a biotite dehydration reaction. In-situ electron microprobe monazite analyses reveal ca. 1150 Ma high-Y probably formed during AMCG magmatism. Outer cores have lower-Y concentrations and yield ages 1098-1041 Ma. These data suggests that monazite growth was accompanied by garnet growth. The results agree with the U-Pb SHRIMP data of Bickford et al. (2008). The youngest dates range from 1050-1000 Ma and are found in the rims locally oriented along the matrix foliation suggesting monazite growth during late-stage Eastern Adirondack shearing.