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SIMS dating of the Neoproterozoic to Eoproterozoic Saglek block, Labrador

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The Nain Complex of coastal Labrador comprises Neoproterozoic amphibolite to granulite-facies gneisses that include among protoliths some of the oldest tonalite-trondjemite-granodiorite (TTG) crust preserved on Earth. Samples of felsic orthogneiss and pelitic paragneiss collected along a 70km north-south coastal traverse from Hebron to Ramah Bay were examined and zircon and monazite dated by Sensitive High-Resolution Ion Microprobe. Tonalitic and granodioritic orthogneisses have petrographic evidence of partial melting at granulite-grade conditions, with subsequent low-grade metamorphism at Little Ramah Bay possibly related to the juxtaposition of the Nain Complex against Paleoproterozoic sediments of the Ramah Group. Magmatic protolith ages were derived from zircon cores with characteristic igneous growth textures, yielding ages of ca. 3.69 to 3.71Ga, consistent with previous estimates for the protoliths of Uivak I gneiss [1]. No evidence was found for the recent suggestion of >3.95Ga protoliths to the Uivak I gneiss [2]. Metapelite from Reichel Head, which contains small amounts of leucosome and garnet-spinel-sillimanite assemblages indicative of granulite-facies metamorphism, yielded abundant detrital zircon with distinctive oscillatory growth zoning and ages of ca. 3.23Ga. This age matches those of magmatic protoliths of Uivak II and Lister Gneiss [1], and is consistent with the timing of deposition of the Upernavik supercrustal sequence [3]. The new data from Ramah Bay area extends the known outcrop of Uivak I and Upernavik gneisses and suggests their continuation in the Nain Complex further north. Metamorphic ages of ca. 2.7Ga were derived from zircon rims and neoblastic grains in felsic orthogneisses, as well as from monazite grains in orthogneisses and paragneisses. Granodioritic orthogneiss from Little Ramah Bay contained zircon rims and neoblastic sector-zoned grains indicative of growth from anatectic melt, with a ca. 2.74Ga age slightly but significantly older than a 2.70Ga age derived from monazite in the same sample (Fig. 1). The monazite age is equivalent to that of 2.71Ga derived from a sample of garnet-sillimanite metapelite from Shuldham Island in Saglek Fjord, 35km to the south. Monazite in metapelite from Reichel Head yielded a slightly older age of ca. 2.72Ga. These ages are consistent with previous estimates for high-grade metamorphism in the Nain Complex [1], [4]. The differences between zircon and monazite ages may indicate prolonged metamorphic activity.

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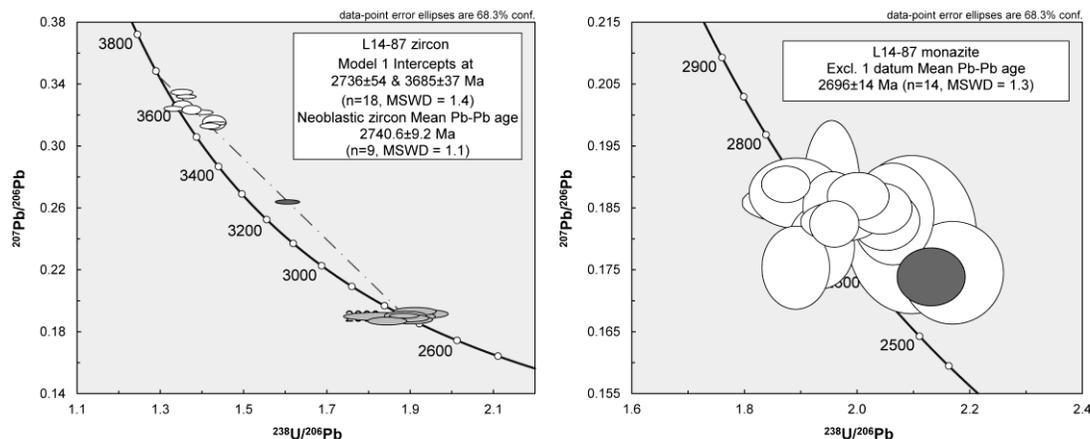


Figure 1: Zircon and

monazite SIMS ages from single sample

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