

## **A monazite and zircon record of Neoproterozoic polymetamorphism in the Saglek Block of Labrador**

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Amphibolite- to granulite-facies gneisses in the Nain Province of coastal Labrador comprise a diverse collection of Eoarchean to Neoproterozoic tonalite-trondjemite-granodiorite (TTG) gneisses and meta-supracrustal lithologies [1,2]. The metamorphic history is complex, with the most pervasive high-grade metamorphism having occurred at ca. 2.7 Ga, followed by multiple Proterozoic events, especially along the margins of the province, that have variably retrogressed earlier metamorphic mineral assemblages [1]. *In situ* mineral and sub-grain analysis of monazite and zircon by Secondary Ion Mass Spectrometry (SIMS) and by Electron Probe MicroAnalysis (EPMA), provide new insights into the extent and nature of metamorphism in the central Saglek Block. Samples were collected along an 80 km north to south coastal traverse from Ramah Bay, through Saglek Bay, to Hebron Fjord. Both monazite and zircon growth during granulite-facies metamorphism occurred between 2.75 Ga and 2.70 Ga in all areas, with an initial stage of zircon growth in anatectic melts at ca. 2750 Ma and a later stage of monazite and zircon growth at ca. 2710 Ma in various amphibolite- to granulite-facies rocks. In addition, monazite growth at ca. 2.5 Ga has been recognised in association with local anatexis in metapelite from Saglek Bay, as well as at other localities along the coastal traverse. The ca. 2.7 Ga Neoproterozoic ages correspond with previous age estimates around Saglek Bay [1, 3], whereas the 2.5 Ga monazite ages increase the known extent of metamorphism from that recorded by titanite ages in Saglek Bay [4] and monazite ages to the south of Hebron Fjord [3].

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[1] Krogh & Kamo, 2006, GSA Spec. Pp. 405, 91-103.

[2] Komiya et al., 2017, Geosci. Frontiers, 8, 355-385.

[3] Schiotte et al., 1990, Geoscience Canada 17, 227-231.

[4] Baadsgaard et al., 1979, Canadian JES 16, 951-961.