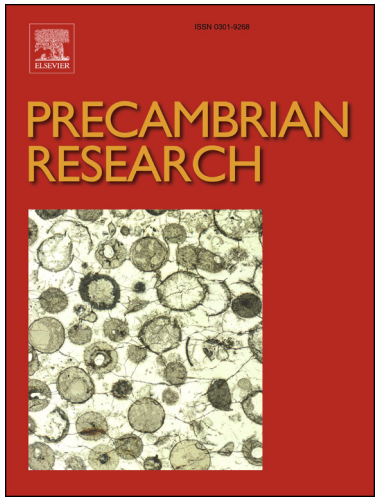

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Geology, lithogeochemistry and U-Pb geochronology of the Aberdeen Lake area, Nunavut: new insights into the Neoarchean tectonic evolution of the central Rae Domain

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Abstract

The Aberdeen Lake supracrustal belt is one of several Neoarchean greenstone belts preserved within the Rae domain of the Western Churchill Province. We divide the belt into: (1) a Lower Sequence of ca. 2750 Ma komatiite, TTG (tonalite-trondhjemite-granodiorite) intrusions, and TTG-contaminated Fe-tholeiitic mafic gneiss; (2) a Middle Sequence of ca. < 2687 Ma psammopelite gneiss, iron formation and ca. 2680 Ma intermediate to felsic intrusive rock; and (3) a ca. < 2650 Ma Upper Sequence of pelite to psammopelite gneiss with minor iron formation and arkosic gneiss. The common association of komatiite with quartzite units and bimodal metavolcanic rocks, has previously been interpreted to indicate a continental rift setting for the formation of Neoarchean greenstone belts across the Rae domain. However, the lack of clastic metasedimentary rocks and felsic metavolcanic rocks in the Lower Sequence of the Aberdeen Lake supracrustal belt, the presence of uncontaminated komatiite, and the general absence of inherited zircons older than ca. 2750 Ma in the TTG and mafic gneiss units, suggest that the Lower Sequence formed as an oceanic plateau or oceanic crust between older, Paleoarchean to Mesoarchean, proto-Rae microcratons. Erosion of the cratons and the emergence of the oceanic plateaux due to their accretion/subcretion to these cratons shed ca. 2687-2870 Ma detritus that were deposited as the Middle Sequence into adjacent oceanic basins. Renewed uplift of the Lower and Middle sequences led to the emplacement of ca. 2680 Ma felsic intrusions, and the later deposition of the ca. < 2650 Ma Upper Sequence. The involvement of oceanic plateaux is a new tectonic interpretation for the