

U-Pb zircon chronology of basement gneisses and granitoids in the Nonacho Lake area, Northwest Territories: correlations to the Rae craton and Queen Maud block

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Approximately 250 km east-southeast of Yellowknife, in the southwestern Rae craton, are the Paleoproterozoic siliciclastic rocks of the Nonacho Group. Detrital zircon U-Pb data from the Nonacho Group has revealed a spread of Paleoproterozoic to Paleoproterozoic dates that contrast the age of typically Rae craton crust. Despite these data, the local basement gneisses and granitoids remain largely unmapped. We present U-Pb zircon age data for this basement and the implications regarding its relationship to the major domains of the western Rae craton, the Queen Maud block and Taltson basement complex.

The basement rocks investigated predominantly comprise amphibolite-facies mafic gneiss, intermediate gneiss with components of granodiorite and diorite, variably deformed granitoids, and locally abundant mafic-ultramafic inclusions. The preliminary data indicates that these rocks are younger than the Neoproterozoic crust that is typical of the Rae craton. Zircons from mafic components record dates between 2.54-2.35 Ga. Some 2.54-2.45 Ga grains are morphologically and texturally consistent with an igneous origin, whereas a population of homogeneous and unzoned grains likely documents ~2.38 Ga metamorphism. Prismatic zircons from a granodiorite record a crystallization age of 2.55-2.48 Ga. Locally preserved biotite-muscovite quartzofeldspathic gneiss is interpreted to be metasedimentary in origin. This unit contains a population of low Th/U (<0.1) zircon rims that may be the product of ~2.48 Ga metamorphism. Approximately 20 km east of the rocks described above, a ca. 2.60 Ga feldspar porphyritic granite occurs that is more typical of Rae crust.

These preliminary age data indicate the presence of rocks with Rae craton, Queen Maud block and Taltson basement complex affinity in the Nonacho Lake area. A significant finding is that the 2.55-2.45 Ga history contains elements of mafic to felsic magmatism and metamorphism that potentially correlate to contemporaneous events in the Queen Maud block.

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