

## **Geochronology of the Palaeoproterozoic Kautokeino Greenstone Belt, Finnmark, Norway, in its Fennoscandian context**

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The northeastern part of the Fennoscandian Shield consists of Archaean cratonic blocks alternating with Palaeoproterozoic greenstone belts ranging in age from c. 2500 to 1950 Ma. Traditionally, the greenstones are interpreted as evidence for rifting of the Archaean continent(s) although it remains unclear whether modern-style oceanic lithosphere developed, followed by a Wilson-cycle-type closure during the Svecokarelian orogeny. Existing geological, isotopic and geochronological data show that the exposed basins hosting the greenstones have distinct lithostratigraphies and geological evolutions and are pericontinental rather than oceanic. A diversity of Palaeoproterozoic mafic mantle derived magmatic rocks show a secular increase of Nd value with time, from  $\text{EpsilonNd} = -2$  at 2500 Ma (Shalskiy dikes, Onega, Russia) to  $\text{EpsilonNd} = +4.4$  at 2090 Ma (Jouttiaapa basalts, Peräpohja, Finland), suggesting that the regional asthenospheric mantle was less depleted than the model MORB-producing depleted mantle before 2090 Ma. In this work, we report new zircon U-Pb geochronological data in 19 samples from Finnmarkvidda, Norway, to constrain the evolution of the Palaeoproterozoic high-strain Kautokeino Greenstone Belt and its relations with the neighbouring felsic Jergul and Ráiseatnu gneiss complexes. The Jergul complex is an Archaean, low heat flow, TTG cratonic bloc of Karelian affinity formed between  $2975 \pm 10$  and  $2776 \pm 6$  Ma. The Masi formation, at the base of the Kautokeino Greenstone Belt, is a typical Jatulian quartzite unconformably overlying the Archean basement. An albite-magnetite-rich mafic sill, similar to the Haaskalehto intrusion in Finland, provides a minimum age of  $2220 \pm 7$  Ma for the deposition of the quartzite. The Likčá and Čáskejas formations represent the main basaltic volcanism. Direct evidence of an oceanic setting or oceanic suture is lacking. A probably synvolcanic gabbro sill gives an age of  $2137 \pm 5$  Ma. Published Sm-Nd whole-rock data on metabasalts provide an  $\text{EpsilonNd} = +2.2$  at 2137 Ma, fitting the secular Fennoscandian trend and more specifically continental mafic dikes in Karelia ( $\text{EpsilonNd} = +2.5$  at 2140 Ma). The Ráiseatnu Gneiss Complex comprises amphibolite-facies granitic orthogneisses, intruded between  $1868 \pm 13$  and  $1828 \pm 5$  Ma. These orthogneisses contain rafts of metasediments and abundant zircon xenocrysts ranging from c. 3100 to 2437 Ma, and are regarded as remelted Palaeoproterozoic metasedimentary rocks. The Kautokeino Greenstone Belt is interpreted as a weak Palaeoproterozoic pericontinental lithospheric domain, that accommodated oblique convergence between the stronger Karelian and the Norrbotten cratons during the Svecokarelian orogeny. Convergence was possibly associated with a mechanism of lithospheric subduction or lithospheric drip off.