

## Age and Sm-Nd isotopes of Palaeoproterozoic mafic rocks in Finland – evidence for rifting stages and magma sources

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Isotopic studies on mafic dykes, intrusions and volcanic rocks from the Karelian domain in Finland indicate rifting of the Archaean lithosphere at several distinct stages including ca. 2.44 Ga, 2.3 Ga, 2.22 Ga, 2.15 - 2.11 Ga, 2.05 Ga, 2.0 Ga, 1.95 Ga and 1.8 Ga (Huhma et al 2011 and references therein). This view is based on a database comprising U-Pb zircon (or baddeleyite) ages for ca. 150 mafic samples, supported by Sm-Nd mineral ages for ca. 50 samples. Many of these results date regionally important dyke swarms and large gabbroic intrusions, and can also be used to reliably constrain ages of the main Karelian volcanic events, which have produced the mafic formations that are a major component of bedrock especially in Central Lapland.

Samarium-neodymium mineral and whole-rock analyses have been made at GTK since the early 1980's. The database currently includes more than 800 analyses on Palaeoproterozoic mafic rock units in the Karelian domain. As many of the initial  $\epsilon\text{Nd}$  values are based on the Sm-Nd mineral isochrons, they should give reliable estimates for the initial isotopic composition of the investigated, in most cases ultimately mantle-derived rocks. These data together with U-Pb ages and geochemical and other geological information provide tools for constraining the age and origin of the magmas of the major mafic episodes and thereby the evolution of lithosphere and mantle components. The observed initial  $\epsilon\text{Nd}$  values range from very positive to strongly negative. High initial values suggest derivation from depleted mantle sources, whereas low values point to a large contribution from old enriched continental lithosphere.

### References:

Huhma H., O'Brien H., Lahaye Y. & Mänttari I. 2011. Isotope geology and Fennoscandian lithosphere evolution. Geological Survey of Finland, Special Paper 49, 35-48.