

The origin of the Archaean Lake Inari TTG-amphibolite complex of the Lapland-Kola Province, northern Finland

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Earth's early basaltic crust has transformed into a thick TTG (tonalite-trondhjemite-granodiorite) crust during the Archaean Eon (4.0–2.5 Ga). The formation of TTGs as the result of melting of hydrated mafic rocks is well established by geochemical modeling and experimental methods, but field studies are rare. Our study investigates the migmatite structures, geochemistry, and geochronology of the 2.9–2.6 Ga Lake Inari TTG-amphibolite complex in the Lapland-Kola Province (Lahtinen & Huhma 2019), northern Finland. The complex shows various migmatite structures such as metatexites, metatexite-diatexite transitions and massive diatexites. The amphibolites are basalts in the TAS classification and have flat or slightly LREE-enriched REE patterns. The TTGs have two geochemically different end members; one showing lower and the other higher HREE, Mg, Sc, Y, Co, and Zn signature. The difference is likely due to the presence or absence of garnet in the source. Fluid-fluxed melting of basalts probably formed the Lake Inari Complex. Buoyant diatexite melts migrated upward and disaggregated amphibolites but were ultimately trapped in the deep crust.

References

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